Instrumentation Scientifique de Laboratoire

User's Manual

CPP 5Gs

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Historical Review

Revision index	§ concerned	Modification descriptive	Date
A		Creation	00/10/01
B	Appendix E §1.5 & 2.5 Appendix F	Modification of constructive elements of cloud and pour points detection heads. Insertion of spare part list.	01/11/15
C	Section 1 § 2.4 ; 2.5	Rapid cooling method description; prestored programs list update	03/03/03
	Section 2 § 6.3.2	Pour program cooling profile description.	
	Section 2 § 8.4	Description of new jacket temperature checking procedure.	
	Section 2 § 9.2	Warning alarm list update.	
	Section 2 § 9.7	Update of service configuration menu.	
	Section 2 § 9.7.1	Update of regulation parameters entry menu. Description of reheating stage at the end of test.	
D	General § 6.2	Welcome screen: language choice at power on	03/07/23
	Part 1 § 2.62	Auto edition function	
	Part 2 § 5.6	Printer configuration menu	
	Part 2 § 6.2	Starting of the tilting tests at Tp + 9°C – (x test frequency)	
	Part 2 § 9	Alarms treatment with historical	
	Part 2 § 10.1	Configuration menu at power on: locking of the language choice et configuration of the auto edition function	
	Part 2 § 10.3.2	Failure alarms update: sample temperature alarm	
	Part 2 § 10.3.3	Warning alarms update	
	Appendix B	Description of the communication protocol of the RS 232C link	
E	Part 2 § 4	Storing of tests without results	05/05/04
	Part 2 § 5.1	Printing of tests without result	
	Part 2 § 7.2	Updating of flags	
	Appendix B § 5.2	Updating of message formats of results sent through the RS 232C link	
	Appendix E	Mounting and using the Manual CFPP Kit	
F	General § 1	Updating of ISL Company profile	04/10/05
	General § 2	Addition of DIN ISO3016 standard method	
	General § 4.3.3	Updating of sections 4.3.3.1 “RS 232C serial link” and 4.3.3.2 “RS485 serial link – Connection to ALAN® Network”	
	Part 1 § 2	Adding of a list of operator names: Updating of Diagram 1 “Test Launch Diagram”	
	Part 1 § 2.4.1	Use of the ***Opér.*** key with the list of prestored operator names	
	Part 2	Updating of diagrams of main level screens: The ***Program*** menu is replaced by the ***Run Environment*** menu	
	Part 2 § 6	Modification of title; Updating of diagram 4: The ***Run Environment menu***; Adding of section 6.4: Operator name list setting menu	
	Part 2 § 7.2	Adding of screen 4 of the ***Diagnostic*** menu: endurance of the cooling unit accessible from the level 2	
	Part 2 § 10.2.1	Modification of the warning alarm setup menu	
	Appendix A	Updating of printout examples: adding of the cooling unit serial number in the heading	
	Appendix C	Updating of Test Launch Diagram (list of operator names available)	

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CUSTOMER REPORT

Reserved for public relations department
N° .....
Date .....

PURPOSE

I wish to
- ☐ Report an error
- ☐ Submit a suggestion / a comment
- ☐ Get more information

In the area of ☐ Hardware ☐ Software ☐ Manual

ANALYZER ENVIRONMENT (please be complete)

• HARDWARE Type of analyzer: .....

Serial N° : .....

Options:
- ☐ Parallel printer
- ☐ Graphic printer
- ☐ Plotter
- ☐ RS232C interface
- ☐ Current loop interface
- ☐ Other : .....

• SOFTWARE Version : .....

ATTACHED SHEETS

☐ Listing ☐ Diskette ☐ Drawing ☐ Text ☐ Other

PROBLEM DESCRIPTION / COMMENTS

_____

_____

_____

_____

_____

_____

SUBMITTED BY

Name :

Company :

Address :

Phone : Fax : Date:

Send this report to your local Sales office or to Groupe ISL - Service Clients
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Warning

The ISL Analyzer you have just purchased has been designed and built with care to ensure safety and reliability in operation
However, using the analyzer involves the handling of chemicals which may be hazardous (e.g., flammable or toxic). You should therefore be watchful and take every precaution to prevent accidents.

We advise you to:

- *read the manual carefully*
- *wear adequate protective clothing*
- *take all the maintenance steps suggested*
- *exercise caution to avoid accidents*

ISL disclaims all liability with respect to the usage of the instruments it manufactures.

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General

1.Introduction

1.1.ISL Company Profile

We would like to take this opportunity to thank you for choosing ISL product. We are confident that you will be completely satisfied with your new Analyzer and we hope that you continue to call on us for all of your laboratory's petroleum testing needs. Before you begin, we ask you to take a few minutes to become acquainted with ISL and its history.

ISL's beginnings go back to 1975, when a group of engineers and scientists from the heart of the Northern France's petrochemical industry began seeking ways to automate petroleum testing. The neighboring industry served as an excellent research and development proving ground for their new equipment.

By the end of 70's, several quality instruments had been developed and were being marketed in Europe under ATPEM Trademark.

The most famous of these new instruments was the CPP 97, Automatic Cloud and Pour Point Analyzer. Introduced in the early 1980's, its successor, the CPP97-6, revolutionized cold flow testing enabling up to six tests automatically and simultaneously.

Adding new automatic instruments each year, ATPEM soon became a worldwide leader in automatic petroleum test instrumentation. In 1986, they expanded operations, reorganizing into the company now knows as ISL.

Striving to maintain close contact with customers in over 75 countries, ISL has since grown, founded Sales & Service branches on each continent. With design, marketing, service and support operating together under the ISL roof, the company reached "a new dimension" in 1993 by obtaining ISO 9002 certification from the BVQI. Working hard to extend our quality assurance program, we received ISO 9001 certification in 1995.

Though best known for distillation, viscosity testing, cold behavior instrumentation, flash point, evaporation loss, oxidation, and asphalt testing equipment, ISL's contributions to automated petroleum testing continue to grow. With more than 10 patents to date, ISL's constant research into new technologies buttresses our precedent for ultimate precision, performance and safety. The company now offers over 20 Automatic Analyzers for different applications giving incontestable benefits to its users in increasing of test precision by elimination of operator subjectivity and human errors, while increasing productivity and reduces operator time with highest level of safety.

A worldwide distribution network supports our customers with quick, efficient service, and our highly knowledgeable service staff buttresses this relationship, providing solutions to product or application challenges.

Please visit our web site for more information: http://www.isl-france.com .

1.2.Type conventions

Convention	Meaning
Bold	Important words or sentences
Bold Italics	Menus or buttons displayed on LCD screen
Bold + SMALL	Keys on instrument
CAPITALS	front panel

1.3.About this manual

This manual consists of the following main sections:

1. 0:Using the CPP 5Gs with pre-installed programs.
2. Part 2: Advanced utilization of the CPP 5Gs.

0 will enable an operator to use the CPP 5Gs for a first cloud-point and pour-point test in a few easy stages, with no specific prior knowledge.
As to Part 2, it is intended to permit users to take full advantage of the instrument's potential. It is directed at experienced users who have a working knowledge of testing from levels 1 and 2. In any event, the sensitive sections of the CPP 5Gs control software, namely those relating to test parameters can be read- and write-protected through a combination of passwords selected by the user.
All CPP 5Gs have a built-in refrigeration system.

2.Analyzer type

The CPP 5Gs is a fully automatic instrument designed for measuring cloud point as per Standards ASTM D 2500, ASTM D 5771, IP 219, IP 444, ISO 3015 and JIS K2269, as well as pour point as per Standards ASTM D 97, ASTM D5853, ASTM D5950, IP 15, IP 441, ISO 3016, DIN ISO 3016, NF T60-105 and JIS K2269. Cloud and pour point tests are used in connection with most products (ship and land-based Diesel engine fuels, power generation fuels, lubricants, white oils, etc…).
By definition, the cloud point test permits determining the temperature at which the paraffin-base constituents of the product may precipitate, a reaction which may cause pipework or filter clogging, or the downgrading of performance in the case of oils. As to the pour point test, it yields the lowest temperature at which the product continues to flow. That information is particularly relevant to the storage of products which must be pumped out afterwards. Pour point is generally 4.5°C to 5.5°C below cloud point, although the difference between those two points may be as much as 8 to 11°C..
The distinctive feature of this instrument is its versatility, as its setup is fully adjustable. It is designed to run programs based on customized sets of parameters selected to suit users' requirements. This major advantage makes the instrument suitable not only for conventional testing, but also for R & D work. Further, versatility has not been achieved to the detriment of operating convenience. As will be seen in the next chapters, the instrument is just as easy to operate as it is versatile. ISL has devoted much care to the design and construction of this instrument and we hope it will give you full satisfaction.

3.Precautions to be observed by users

3.1.Meaning of symbols

	Note	***Important remark.***
	CAUTION !	***Special attention required.***
	Refer to	***Refer to document (e.g., standard) or other manual.***

3.2.Precautions applicable to analyzers with built-in refrigeration system

Analyzers with built-in refrigeration system feature a refrigerating compressor which requires a few specific precautions to ensure analyzer durability and optimum performance:

- Do not operate the analyzer on a support structure which may vibrate. Support and compressor vibrations may become resonant, thereby damaging the analyzer.
- Analyzer optimum operating temperature is about 20°C. To prevent overheating, which would be detrimental to instrument performance, make sure that:

1. There is free space at the back of the instrument ot permit effective heat dissipation.
2. There are no obstructions on the ventilation louver side. Louvers should be kept dust-free using a blowgun to prevent fouling.

4.Unpacking and installation

4.1.Precautions when unpacking

After unpacking, inspect the analyzer and its accessories and check for any damage in transport which should be immediately notified to the carrier for claim purposes.
All parts of the CPP 5Gs have been carefully inspected and tested before shipping. However, it is advisable to verify that the equipment received is consistent with the attached packing slip.
When receiving the CPP 5Gs, unpack all its components.
Place the analyzer on a bench top close to electrical outlets, leaving enough clearance space for easy access to connectors at the back of the instrument.

	For further details on refrigeration unit, refer to ISL specifications.

4.2.Installing the CPP 5Gs: Unlocking the shock-absorbers

The CPP 5Gs refrigerating compressor is supported by a vibration mount which must be locked during transport. The mount locking screws purposely protrude from the underside of the instrument to prevent it from resting evenly on the bench top, as a reminder to remove the screws.
Therefore, the first steps after unpacking should be:

1. To remove the vibration mount locking screws located under the instrument.
2. To store the screws at the back of the analyzer as shown below.

Vibration mount locking screw

Storing locking screws at back of analyzer

Figure 1: Locking/unlocking vibration mount

4.3.Connections

4.3.1.Connecting to the electric power supply

After unpacking the CPP 5Gs, make all the required connections to the accessories, network and systems.
It should be noted that the CPP 5Gs is designed for 90-130 V and 180-250 V, 50/60 Hz power, which should cover conditions in most of the countries where it is commercially available. The instrument is delivered with a power cord suitable for the country where it was sold.

4.3.2.Connecting the sample temperature probe

1. Connect the probe LEMO plug to the appropriate front panel socket.
2. Insert probe into the probe carrier at instrument top.

4.3.3.CPP 5G/s / PC link

The CPP 5Gs analyzer is fitted as standard with an RS 232C interface and an RS485 interface.

4.3.3.1. RS 232C serial link

The network input / output ports of the analyzer link interface with the ALAN® network may be connected via a special adapter supplied with the analyzer to form an RS 232C serial link enabling results to be collected on a PC and for transmission to a LIMS (see Appendix B – "RS232 link features on CPP 5Gs" page 79 for more precision on the communication protocol of the RS 232C link and the meaning of the message content).
Use the adapter supplied with the analyzer (see the Packing List): it has two RS485 connectors on one side, which have to be connected simultaneously to the analyzer's ALAN® input and output ports, and on the other side an RS 232C connector to be connected to the PC.

Note: ISL analyzers allow transmitting data according to specific customized criteria and a user defined protocol.

The RS 232C communication interface has to be parameterized. Refer to the section 10.5.1 – "RS 232 C link configuration: "RS 232 C link setup" menu" page 2-67.

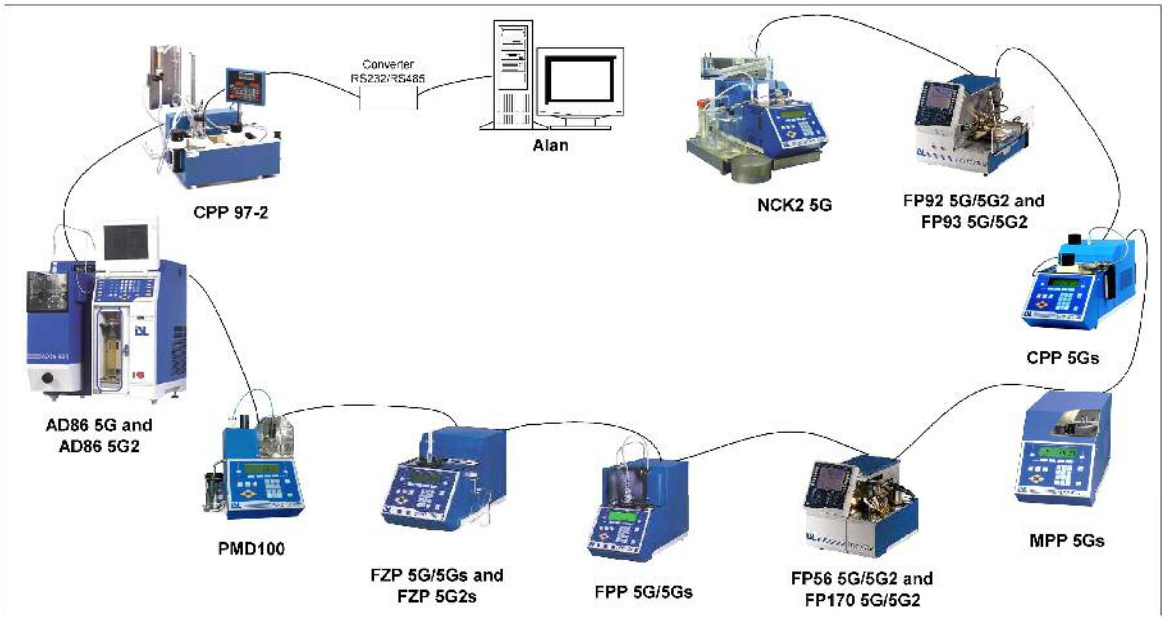
4.3.3.2.RS485 serial link – Connection to ALAN® Network

The CPP 5Gs has been designed to run under the ALAN® management software developed by ISL
The **ALAN**® software (**A**utomatic **L**aboratory **A**nalyzer **N**etwork) is a multitasking software running under Windows© and allowing up to 31 ISL analyzers to be connected to the same PC computer (see the illustration below). It allows data coming from different ISL analyzers to be collected and stored.
Besides multi-analyzers results database management and control (according to the analyzer type: run control, alarms displaying, internal parameters management…), the ISL ALAN® software allows transmitting results directly to a LIMS (or ever information system).

Note: The ALAN® Kit is optional hardware and software package. Refer to the ALAN® Installation and Getting Started Manual.

Each analyzer connects to the ALAN® network via the RS485 serial interface through two ports (input/output) located on the rear panel (see Figure 2 page 18 for more explanations).

Example of an ISL analyzers network:



Note: The RS485 communication interface has to be parameterized. Refer to the section 10.5.2 – "PC link configuration: "PC link setup" menu" page 2-68.

4.3.4.Connecting a printer

A parallel port is provided at the rear of the analyzer for connecting a printer compatible with the Analyzer (40 or 80 columns and using the ESC/P language) with which to print out test results, among other things.

Caution! The Analyzer and peripherals must be switched off before connecting any new peripherals.

4.3.5."SERVICE" port

The CPP 5G/s has a serial « SERVICE » port as a standard fitting with which, with the help of the « ISL UDS » maintenance software supplied, software updates can be downloaded via a PC and the contents of the memory such as the internal parameters and results can be saved for subsequent reloading (refer to the Part 2 section 10.7.4 - File uploading/downloading: "Upload/Download" menu page 2-70).

4.4.Analyzer rear panel and connectors

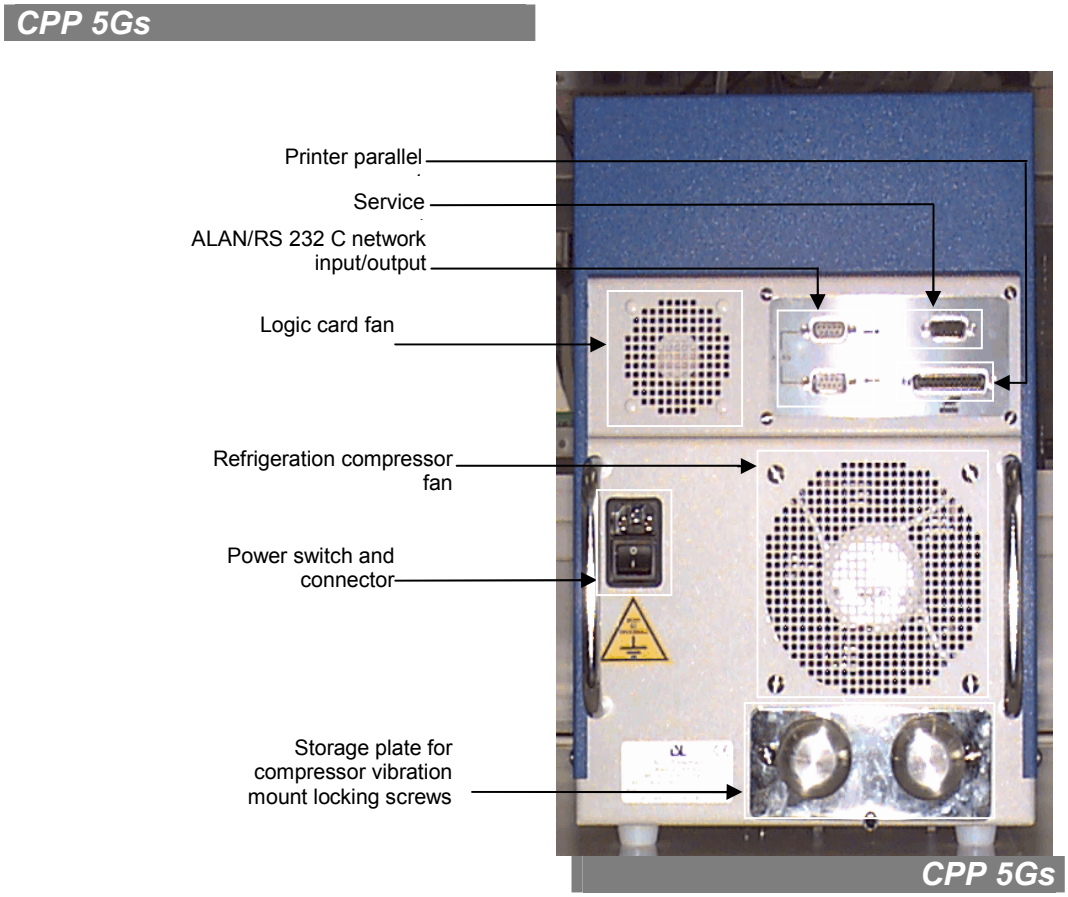


Figure 2: Analyzer rear panel and connectors

5.Instrument description

The CPP 5Gs consists of two main parts:

- The user interface.
- The measuring unit and associated electronic and mechanical components.

The user interface is covered in the next paragraph.
The equipment required for cloud- and pour point tests (in direct contact with the sample) strictly complies with the applicable standard.
The CPP 5Gs includes:

1. A transparent, cylindrical, flat-bottomed glass test tube with a permanent marking for 45 mL volume, which contains the sample. For cloud point testing, use the test tube with a reflecting bottom.
2. A flat-bottomed brass cylinder providing a leak-tight air bath, known (in compliance with the standard) as the Jacket, .designed to hold the test tube for heating or cooling purposes.
3. An insulating assembly consisting of a bottom disc and Top ring, providing heat insulation between the test tube and jacket so that the heat transfer takes place through the air bath, rather than by contact. A measuring head includes a sample probe which measures sample temperature, a light source and a detection cell for determining cloud- and pour points. The arrangement of the above three components depends on the type of measuring head.
4. A Temperature Control System consisting of a heating resistor, a cooling system and a temperature sensor which measures jacket temperature.
5. A tilting mechanism (consisting of a motor and drive) for tilting the jacket during the pour point test.

Refer to the Part 2 section 8.1 page 2-56 for temperature probe calibration procedure.

6.User interface

6.1.Instrument front panel

The instrument front panel includes the following features:

8 line, backlight LCD screen
Navigator key
Stop, Reset & Alarm Stop keys
Text field cursor key
Key for activating menus & buttons displayed
Numeric key pad, with "DEL" and "ENTER" keys
CPP 5Gs

Figure 3:Analyzer front panel.

6.1.1.LCD screen

The front panel 8-line LCD screen is laid out as follows:

Go up one level in screen hierarchy
Previous screen
Button calling for entry of numeric or alphanumeric data
Next screen
Menu to be activated using the key just below (see figure 3)

Figure 4: Screen and menus general layout

"Previous screen" and **"Next screen"** side keys are provided for navigating through screen hierarchy (see Figure 3). At the bottom of the screen, four keys permit activating the menus displayed on the screen.

6.1.2.Backlight setting

The LCD screen backlight is set by a combination of the **ENTER KEY** and the high **DIRECTION KEY** for less contrast and low **DIRECTION KEY** for more contrast (refer to the next section).

Note: The intensity of the backlight can change according to the ambient temperature.

6.1.3.Control keys

The following three keys are located at the bottom left of the front panel:

STOP/TEST: for ending test.
If the LED is on, it means that a test is being run.

RESET: To cancel and go up in screen hierarchy

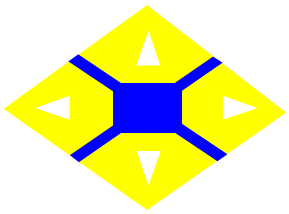
ALARM STOP: interrupt audible alarm signal.
If the LED is ON, this means a problem. Pressing the button will display the error message.

The remaining area of the front panel is occupied by a numeric keypad with "DEL" and "ENTER" keys.

ENTER key: validates data entry.

DEL key: deletes characters.

Last, four cursor keys are provided at the bottom left to move through text fields and select characters for data entry (e.g., sample name).



Direction Keys.

6.2.Welcome screen

When the CPP 5Gs analyzer is switched on, the welcome screen is displayed. If it does not, first check the backlight settings (see section 6.1.2 on the previous page).
This screen provides information about ISL and two menus offering the choice of language.

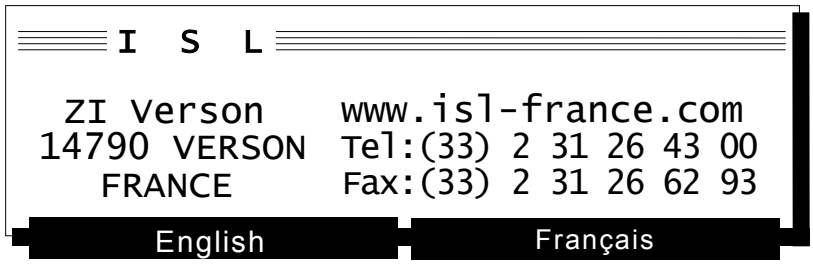


Figure 5 : Welcome screen

The welcome screen remains on until a language is selected. Presse the key corresponding to the language of your choice. The screen displaying is the screen 1 of the **Test/Start** menu (see Figure 8 page 1-27).
Note : You can disable the language choice as part of the startup parameters (refer to the Part 2 section 10.1 - Power-on parameters: "Start" menu page 2-63). If the choice is locked, press any key on the front panel.

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Part 1 Using the CPP 5Gs with pre-installed programs

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1.Introduction

As mentioned above, the versatile nature of the CPP 5Gs is evidenced by its suitability for testing to existing standards, as well as for customized test programs based on specific calibration data.
This part covers standard cloud and pour point testing. A total of fifteen test programs applicable to the "Cloud", "Pour" and "Manual" modes are factory-installed by ISL. They are stored in a memory and can be easily updated by the user (e.g., following a change to a standard) manually or by download from a PC with the "ISL ALAN® Suite" software specially designed by ISL (via the ALAN® – RS 485 link).

2.First test

This chapter gives a step-by-step description of a standard test using the CPP 5Gs. This description will however be limited to those menus which are strictly necessary for the proper conduct of the test. Further, it will be assumed that the operator is familiar with the precautions required for handling the products under test and the cleaning products.

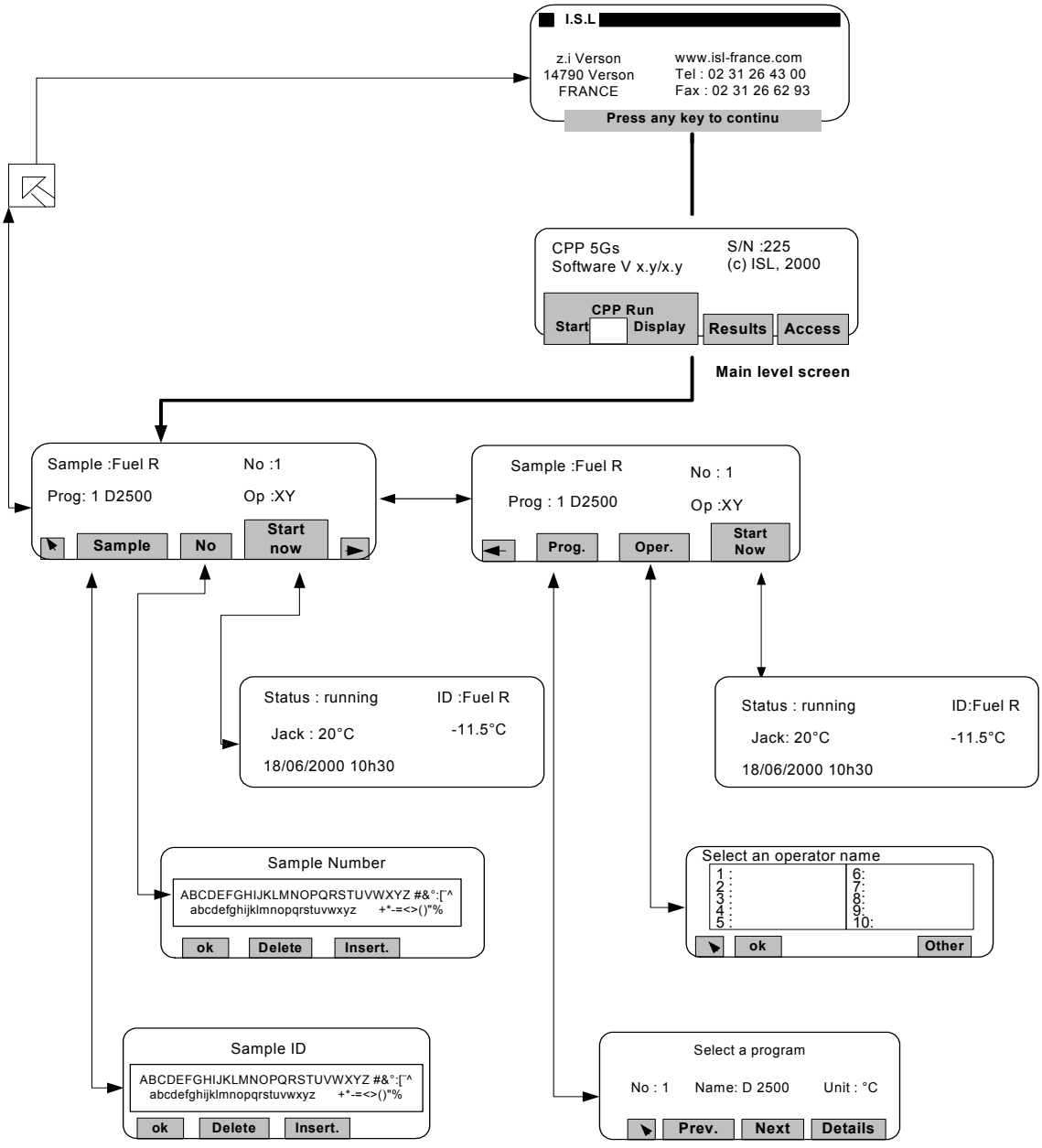


Chart 1: Starting a test

2.1.Preparing sample

Before starting the test, a sample has to be prepared.

Procedure :

1. Choose M00430 test tube with reflecting bottom for a cloud point test, or an M00428 type for a pour point test, and fill it up to the 45 ml. mark.
2. Inset the cork ring into the positioning jig, then fully inset the test tube. Ring position will thus be as specified by the standard.
3. Place a cork disc at the bottom of the jacket (the disc should be in good condition for successful testing) and insert the test tube into the jacket. Select a "cloud point" or "pour point" measuring head (see relevant figure), introduce it into the test tube previously prepared, then clip it and screw it down onto the jacket. Before starting test, check that the measuring head selected is connected to the central processing unit.

2.2.Cloud point measuring head

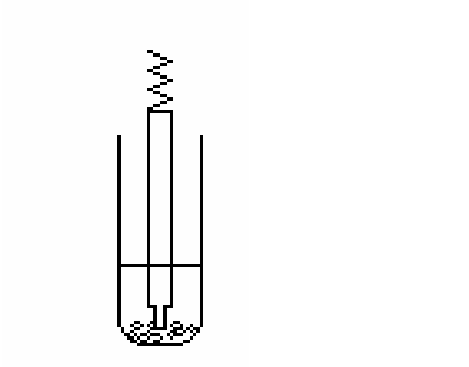


Figure 6: Cloud point measuring head symbol

2.3.Pour point measuring head

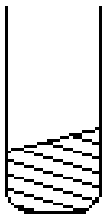


Figure 7: Pour point measuring head

2.4.Sample analysis

2.4.1.In cloud mode

Connecting a "Cloud point" head causes the default "cloud" program to become the running program.

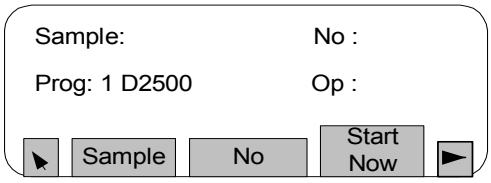


Figure 8: Screen 1 of CPP/Start menu

Screen 1 of the **Test** menu includes the following functions:

Sample: button for entering sample ID
No: button for entering sample number
Start Now: test start button

Screen 2 of the **CPP** menu, accessed through the "Next Screen" button, features the same fields as the previous screen in its top area, and the following buttons in its top area:

Prog: test program selection button
Oper: test operator ID selection / entry button
Start Now: test start button

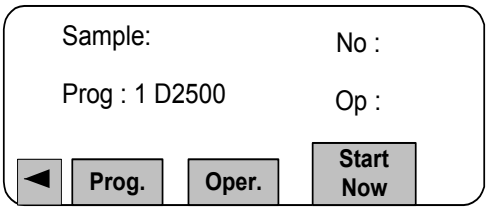


*Figure 9: Screen 2 of **Test/Start** menu*

The ***Prog.*** button permits selecting one of the factory-installed programs. Activating the ***Prog.*** menu displays the following screen:

*Figure 10: Screen 1 of **Program** menu*

To select the desired program, activate the ***"Next"*** or ***"Previous"*** button as many times as required. When the desired program is displayed, activate the ***OK*** button. The **"Details"** button and related menus will be covered in the "Advanced Utilization" section of this manual.

The ***Opér.*** button permits selecting one of the pre-installed operator names. Activating the ***Opér.*** menu displays the following screen:

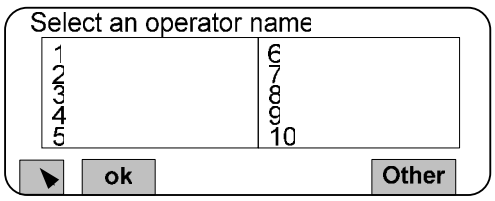


*Figure 11: Screen 1 of **Program** menu*

The CPP 5Gs can store up to 10 operator names. If the desired name is already stored, activate the corresponding field by means of the front panel **DIRECTIONNAL KEYS** and press ***OK.***, the initial display returns automatically to the start menu.
To enter a new name, press the ***Other*** key. This calls the text entry display (refer to the section 2.6 page 1-31).

The ***Other*** menu allows identifying an operator without using the prerecorded ones, but this new name will not be stored in the operator list. This function is used to carry out an isolated test. To enter a new operator name in the memory, refer to the section 6.4 page 2-51).

2.4.2.In "Pour" mode

The analyzer switches to the "Pour" mode as the pour point measuring head is connected. If the connection is not effective, the instrument will automatically recognize a cloud point test as the default. Thus, proceeding as above following power up, the following screen will be displayed:

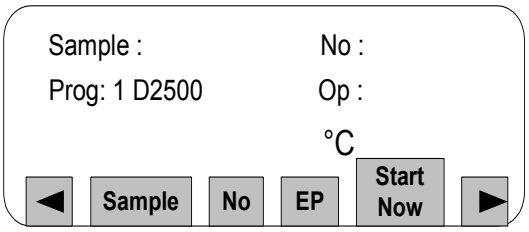


*Figure 12: Screen 1 of the **Pour point test/Start** menu*

Sample ID, sample No., test start and screen navigation data are the same as in the "cloud" mode. The only change is the **"EP"** additional button which permits selecting a pour point temperature, required for starting the test.

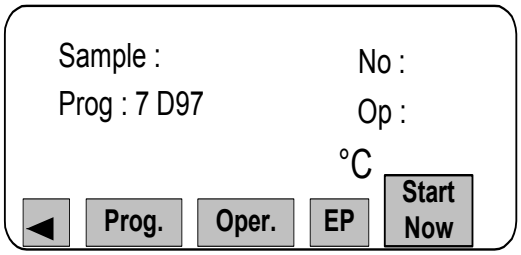
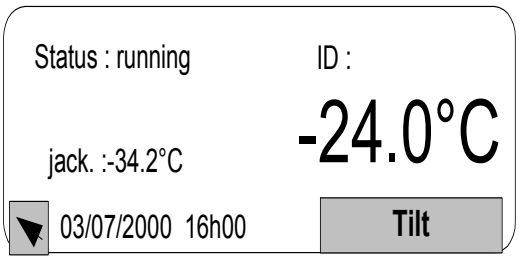


*Figure 13: Screen 2 of **pour point test** menu*

The **PROG.**, **OPER**. and **START NOW** buttons are the same as in screen 2 of the ***CPP/Start*** menu and have the same functions, except for the EP button which was already present on screen 1. When starting the test, you will see the following screen:

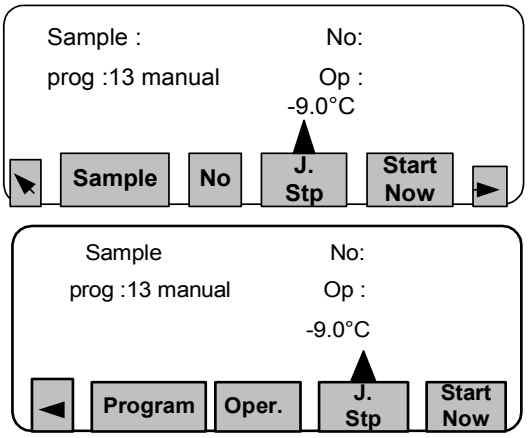


The above screen displays the following data:

- Status: instrument status
- ID: sample ID
- Jack. : Jacket temperature
- Date and time of test
- **TILT**: this button controls jacket tilt (in a pour point test)
- In bold figures: sample temperature as measured by the probe.

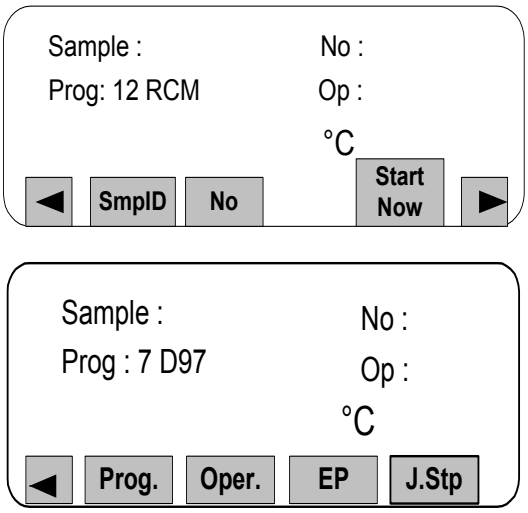
2.4.3.In "Manual" mode

In the "Manual" mode, the operator can conduct tests manually. To operate in this mode, no measuring head should be connected (no selection of the measuring head possible) and the operator should select factory-installed "Manual" program # 13. Jacket temperature is selected directly using the numeric keypad. Two screens appear in succession at the same level:



2.4.4.In "Pour" mode - Rapid Cooling Mode

The operator must select the program N°12, RCM. - Rapid Cooling Method. The pour point temperature is required to start the test.



When the EP (pour point temperature) is entered, the jacket setpoint temperature is automatically calculated and displayed. It is determined according the EP entered and the cooling profile associated with the rapid cooling program. Nevertheless, the operator can modify the jacket setpoint temperature manually using the additional button “J.Stp”.

2.5.Programmed temperature profiles

The CPP 5Gs features 15 factory-installed programs covering the Cloud point, Pour point and Manual modes and the Rapid Cooling Method. The following programs are available:

Cloud point

N°1: D2500. Cloud point test to Standard ASTM D2500 . Temperature in ° C.
N°2: D5771. Cloud point test to Standard ASTM D5771. Temperature in °C.
N°3: ISO 3015. Cloud point test to Standard ISO 3015. Temperature in °C
N°4: IP 129. Cloud point test to Standard QP 129. Temperature in °C
N°5: NFT 60105 cloud point. Cloud point test to Standard NF60105. Temperature in °C
N°6: Cloud point. Standard cloud point test. Temperature in °C
N°14: Cloud (PC). Storage area to be used on a priority basis for downloading cloud point test programs

Pour point

N°7: D97. Standard pour point test. Temperature in °C
N°8 : D5950. Standard pour point test. Temperature in °C
N°9: ISO 3016. Standard pour point test. Temperature in °C
N°10: IP15. Standard pour point test. Temperature in °C
N°11: NFT 60105 pour point. Standard pour point. Temperature in °C.
N°12 : RCM. Non standard pour point test with rapid cooling method. Temperature in °C
N°15: Pour (PC). Storage area to be used on a priority basis for downloading pour point test programs

Manual

N°13: Manual. Pour point or cloud point test carried out manually

2.6. Text entry screen

2.6.1. Text entry

This screen is shown at all levels. It consists of two sections:
The top section (**entry** section) where the name is entered.
The bottom section, **recurrent** irrespective of "name" field, which contains a sequence of alphabetic characters from which the characters to be entered are selected, and the following three buttons: **OK**, **Delete** and **Insert**;

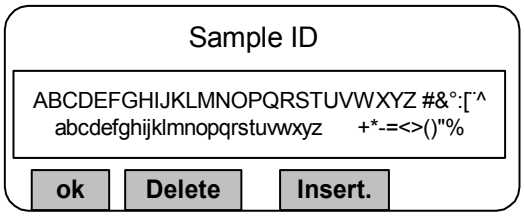


Figure 14: Text entry screen. The field shown is the sample ID.

To enter character, proceed as follows:

☞ ***Enter characters directly using the numeric keypad.***

1. When the entry sceen is displayed, a ablack rectangle blinks over the first letter in the sequence (the letter **A**). To select a letter, use the front panel cursor keys. Press appropriate cursor key as many times as required (or hold key down).
2. When the black rectangle is positioned over the desired character, press the **ENTER** key of the numeric keyboard. If the character is not the right one, erase it using the **DELETE** key.
3. If there is an error in the sequence of characters entered, use the **Insert** and **Delete** buttons to correct it.
4. Use the **OK** button to validate the entry.
   Following entry validation using the OK button, the system automatically goes back to the initial screen, i.e. screen 1 of the **CPP/Display menu** – see figure 8 on page 20. The same applies to any text entry through the text entry screen.

2.6.2. Auto edition

To speed up test starting the text entry screen enjoys a semi-automatic input feature: the latest text inputs are stored in memory so that the operator only needs to enter the first two or three characters for the whole to be displayed.
If the function ***Auto Edition*** is activated, the Analyzer proposes a suite when characters are entered according to prior enters. This function is intended for accelerate test initiating and it can be configured or deactivated (refer to the Part 2 section 10.1 - Power-on parameters: "Start" menu page 2-63).

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Part 2 Advanced used of the CPP5Gs

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1.Introduction

This section covers the advanced utilization of the CPP 5Gs, with special reference to the setting up of the analyzer as required by the user. The analyzer's setup is accessible from the main level screen (see next paragraph).

2.Main menu

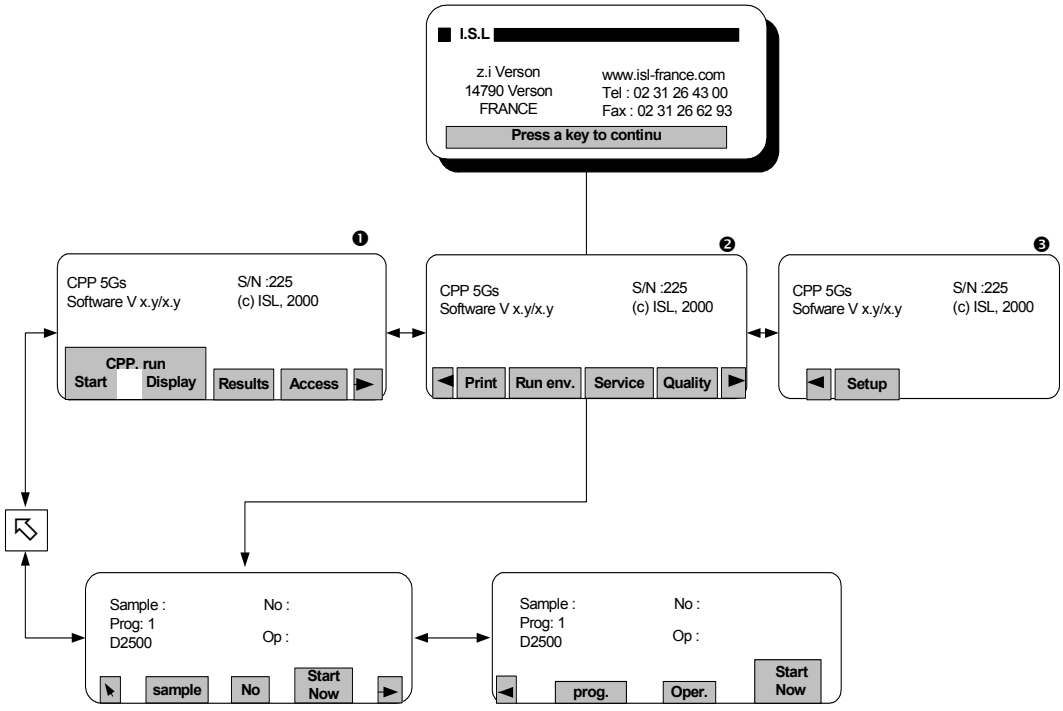


Chart 1: Access to main level screen

The main level screen is the highest in the hierarchy. After switching on the analyzer, press any key as indicated by the welcome screen to access a submenu, from which one must go up one screen level by pressing the appropriate key.
Chart 1 above shows how this level is accessed.

- If the user is at operator level, the available menu (❶) is very simple, and limited to ***CCP Run***, ***Results*** and ***Access*** menu.
  - The user can start and monitor the test.
  - The user can also view and print results.
- If access is at laboratory or service level, the full menu (❶+❷+❸) is available.

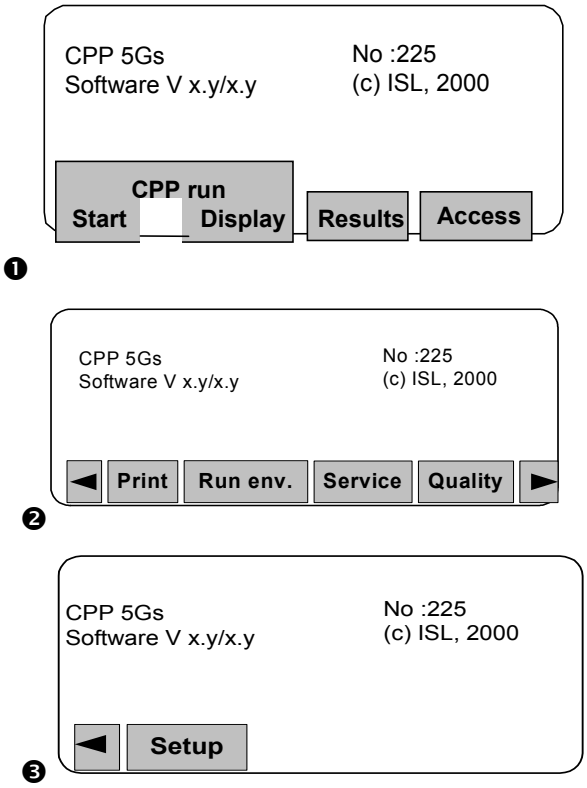


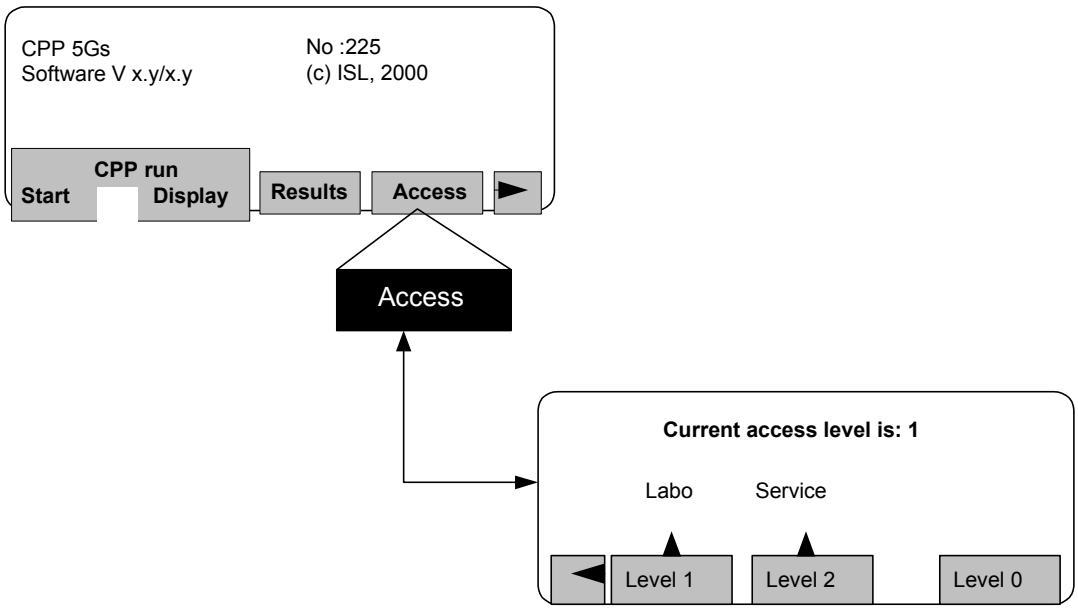
Figure 15: The three main level screens with access level 1 or higher

The main level screen shows the following data, from top to bottom and from left to right respectively:

- Instrument designation.
- Instrument serial number.
- Version of control software/communications messages.

Main level menus are the following: ***CPP Run/Start***, ***CP Run/Display***, ***Results***, ***Access***, ***Print***, ***Environment***, ***Service***, ***Quality*** and ***Setup***. These menus are given detailed coverage in the next paragraphs.
However, it should be noted that the CP Test (Start and Display) menu is practically covered in full in 0. Therefore, in this part we will consider that the access level is level 1 (laboratory level). This level permits access to test-related parameters, which makes it possible to change those parameters and create customized programs aimed at specific requirements. Access levels are discussed in the paragraph covering the ***Setup*** menu.

3.Access levels and password: "Access" menu



If you want to access a function or parameter above levels 0 or 1, the following message is displayed to show current and required access levels. To enter access codes, use **Level 1** and **Level 2** buttons. See **Setup/Lab** menu for level 1 laboratory access code setup. Also see **Setup/Service** menu for the definition of level 2 service access code.

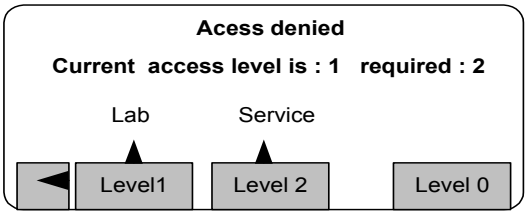


Figure 16: "Access denied" message showing that the level is write-protected

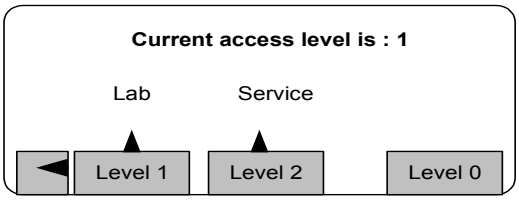


Figure 17: Access menu screen

The main screen of the menu shown above provides access either to a chosen level, or back to level zero. Digital access codes are entered using the numeric keypad. If the code is valid, the level is accessed following validation through the **Enter** key.

4.Results display: "Results" menu

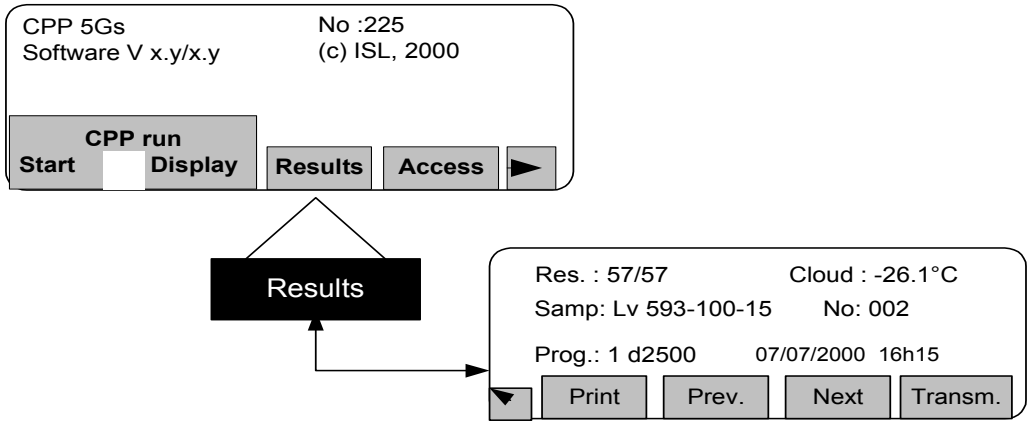


Chart 2: The **Results** *menu*

Test results are stored in a dedicated memory. The CPP 5Gs can store up to 99 test results. When the memory is saturated, the CPP 5Gs will automatically overwrite the first results entered. Results may be uploaded to a PC through the ALAN® or RS 232 C links. See paragraph 10.5.1 - RS 232 C link configuration: "RS 232 C link setup" menu page 2-67.

Note : All results are stored. The end of test message indicates if the test has run in normal conditions.

To view the results, the procedure is as follows:

Procedure:

1.Press ***Results*** button to display the screen showing all recorded data in the following format:

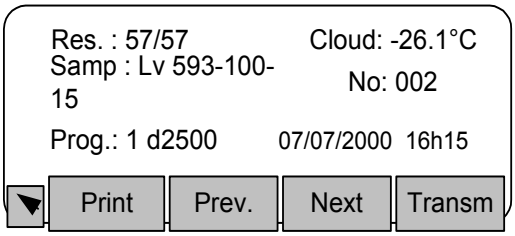


Figure 18: Screen 1 of the ***Results*** *menu.*

- Res. : __/__: result number within the set of results stored in memory.
- Message corresponding to the type of the end of test followed by the test result:
  - 1 : « Cloud : _ _ » : normal cloud end of test
  - 2 : « Pour _ _ » : normal pour end of test
  - 3 : « Test stop at : _ _ » : end of test on stop temperature (cloud or pour)
  - 4 : « Test stop: End cooling prof. » : end of test by end of cooling profile reached (cloud or pour)
  - 5 : « Pour not found at : _ _ » : end of test by number of test reached after EP (pour)
  - 6 : « Pour : _ _ at 1st tilt » : end of test by detection of the first tilting (pour)
- Samp.: Sample ID
- No.: Sample number
- Prog.:the program selected for the test.
- End of test date and time.

To access the desired results, press **PREVIOUS** and **NEXT**" buttons as many times as required. The **PRINT** button starts the printing of the result selected.
The **TRANSM**. Button is used for validating result prior to transmission through RS 232 C link or ALAN® network

5.Printing: "Printing" menu

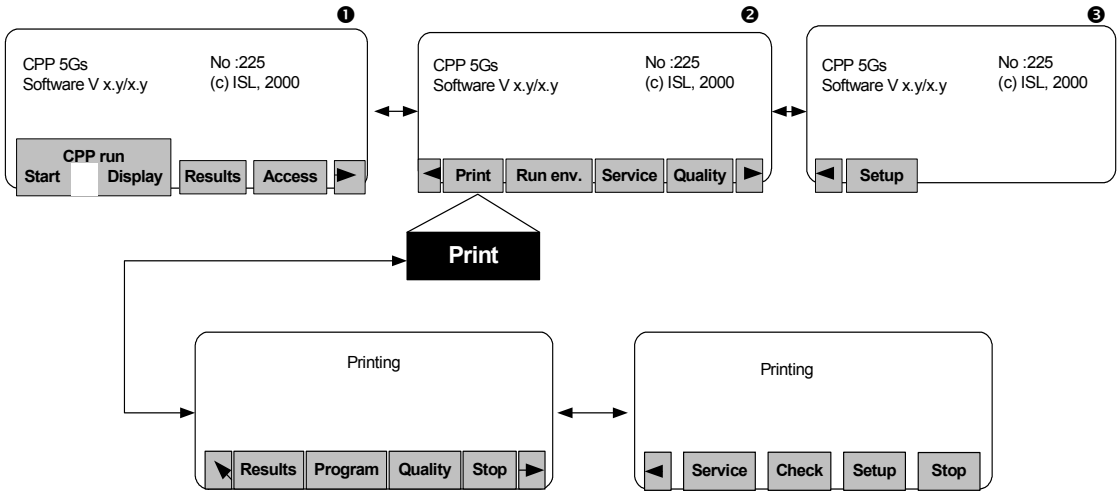


Chart 3: ***Printing*** *menu*

The CPP 5Gs can print the following data: results, calibration ticket or the parameters of a specific program according to the printer configuration (see section 10.4 - Printer setup: "Print" menu page 2-66). This requires connecting the instrument to a printer compatible with the analyzer (40 or 80 column printer using the ESC/p language).
To start printing, activate main level ***Printing*** menu. The following screen is displayed:

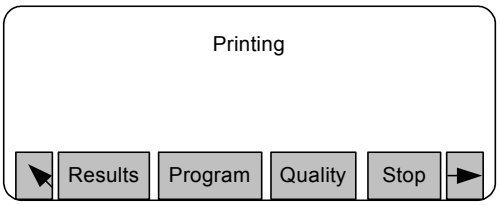


Figure 19: Screen 1 of ***Printing*** *menu*

The first screen of the ***Printing*** menu features the following menus:

- ***Results***: .for printing results;
- ***Progr***.: for printing a test program;
- ***Quality***: for printing the calibration ticket.
- ***Stop***: to interrupt ongoing printing;.

The second screen of the Printing menu: looks like this:

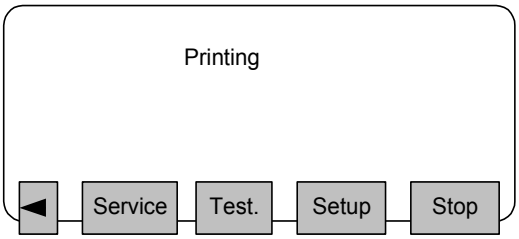


*Figure 20: Screen 2 of **Printing** menu*

Screen 2 features the following menus:

- ***Service*:** for printing data such as ongoing measurement values (sample and jacket temperatures).
- ***Test***: for checking printer link.
- ***Setup***: for setting printing parameters.
- ***Stop***: to interrupt ongoing printing.

5.1.Printing results

The CPP 5Gs can print any test result, or all the previous test results, with or without a program (see Appendix A section 1 - 80-column result print page 75).
Results can be printed at any of two levels:

1. From the **Results** menu, by activating **Printing**. At this level, select the desired result using the **Previous** or **Next** buttons, then print.
2. From the ***Printing menu*** (see Figure 19: Screen 1 of **Printing** menu page 2-39). Upon activation of the ***Results*** menu, the following screen is displayed:

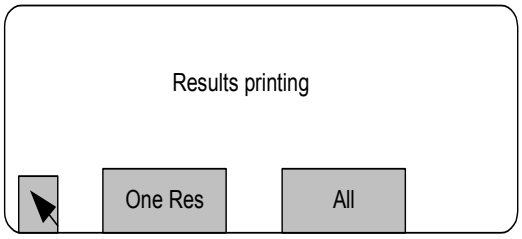


*Figure 21 : Screen 1, **Results** menu (from **Printing** menu)*

This screen permits the printing:

- Of any result. Activating the **ONE RES** button displays the screen of Figure 18: Screen 1 of the **Results** menu**.** page 2-38. At this level, the printing mode is the one mentioned in 1) of this paragraph. It should be noted that a number of printing options are available, among which the printing of the test program used (see section 5.6 - Printer setup page 2-42).
- Of all the results stored in memory can also be printed. In this case, test programs will not be printed.

Note: Test results are printed with the end of test message indicating if the test has run in normal conditions.

Types of the end of test:

- 1 : « Cloud : _ _ » : normal cloud end of test
- 2 : « Pour _ _ » : normal pour end of test
- 3 : « Test stop at : _ _ » : end of test on stop temperature (cloud or pour)
- 4 : « Test stop - End cooling profile » : end of test by end of cooling profile reached (cloud or pour)
- 5 : « Pour not found at : _ _ » : end of test by number of test reached after EP (pour)
- 6 : « Pour : _ _ at 1st tilt » : end of test by detection of the first tilting (pour)

5.2.Printing test program parameters

The CPP 5Gs will also print the parameters of the test program stored in memory. Activating the **Programs** menu will display the following screen which permits selecting a test program.

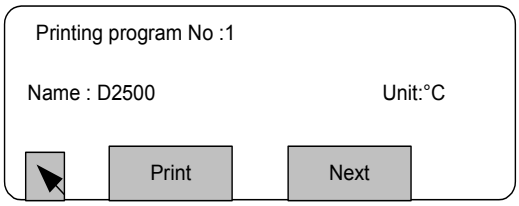


*Figure 22: Program menu screen (**Printing** menu).*

Pressing the **Print** button will start the printing of the program shown on the screen. To print another program, press **next** button to display the desired program, then the **print** button.

5.3. Printing calibration ticket

The calibration ticket can also be printed. This is done by activating the **Quality** menu, :thereby displaying the following screen:

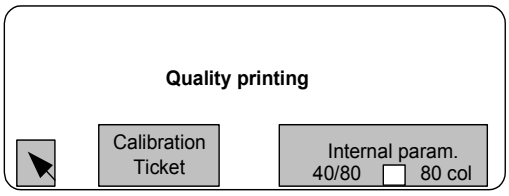


*Figure 23: **Quality** menu screen (**Printing** menu)*

The ***Internal Parameters*** printing button provides the following two options:

- Taking printer configuration into account (40/80 button).
- Always printing in 80-col. Format (80 col. button) irrespective of printer configuration.

5.4.Printing ongoing test results

Measurement results can be printed using the measurement display screen or the **Measure.** button of the next screen:

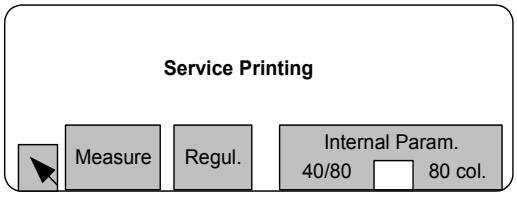


Figure 24: Service printing.

To access the contents of the ***Régul*** menu, authorization to access level 2 (Service) is required. This menu permits collecting and transmitting to a printer or other peripheral (e.g. a PC) regulation data relating to the following components (see Appendix A section 2 - 80-column internal parameter printout page 76):

- Jacket probe

5.5.Printing test

The **Test** button (see Figure 20: Screen 2 of **Printing** menu page 2-40) permits printing a few lines to check the printer ⇔ CPP 5Gs link (see Appendix A section 5 - Printing test page 77). Further, this provides a check on the print quality of certain special characters (e.g., the "degree" symbol), which may have been poorly printed due to incorrect setup.

5.6.Printer setup

To set up the printer, use the **Printer Setup** menu (see section 10.4 - Printer setup: "Print" menu page 2-66). The **Printing** menu in **Setup** can also be used for printer setup
Activating **Setup** (in **Printing** menu) permits displaying the following screens.

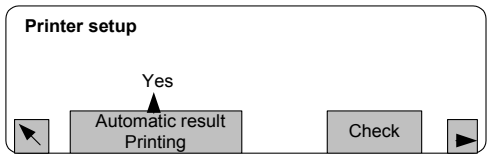
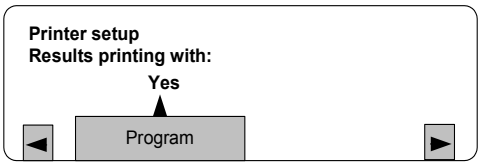
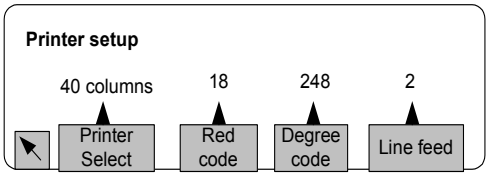
Screen (*Setup* menu).	**Purpose of menu** (from left to right and from top to bottom respectively).	**Field entry**
 Screen 1, *Setup* menu	Printer setup **Automatic printing:** automatic result printing at end of test (if printer is connected to analyzer ***Test*** printer test printing.	Yes/No
		Next sccreen
 Screen2, ***Setup*** menu	Results printing with: ***Program:*** print program used for the test.	Yes/No
		Next screen
 Screen 3 menu ***Config***.	***Printer Select*** : selection of a printer compatible with the analyzer (using ESC/P language) ***Red code*** : code for printing in red ***Degree code*** : ASCII code designating "degree" code (see printer doc.). ***Line feeds*** : number of line feeds after printing.	40/80 col. printer ESC/P compatible (see printer doc.) See printer doc. See printer doc. 0 to 5 or form feed
For example:: Configuration of a CITIZEN® 40-column printer: 40 18 91 2 Configuration of an EPSON® 80-column printer 80 0 248 2		
However, it will be necessary to refer to the printer manual for the exact printer setup.		

Table 1: ***Setup*** *menu screens.*

6.Test setting: the "Run environment" menu

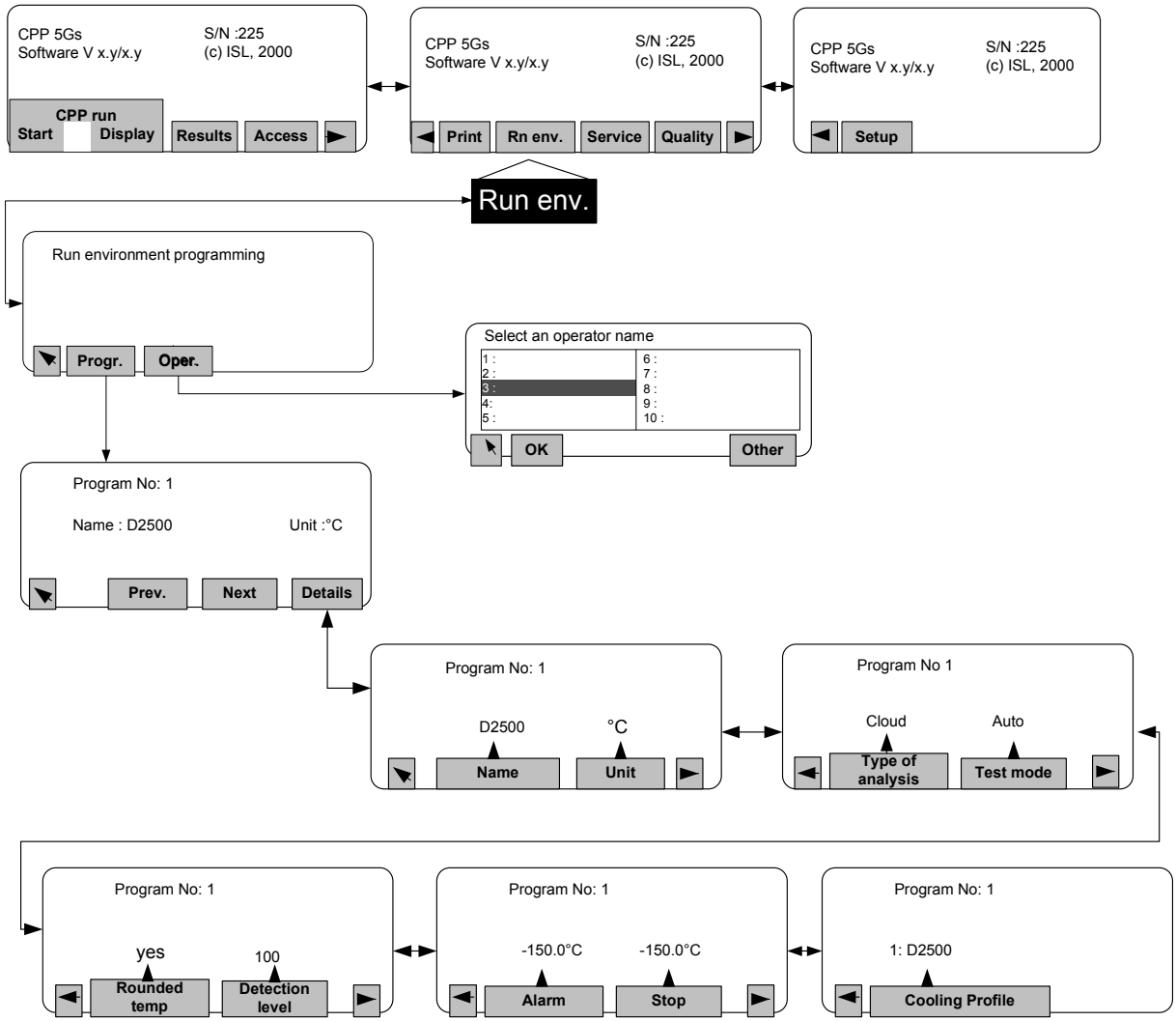


*Chart 4: The **Environ.** menu*

6.1.Test program - cloud method

A test program consists of the following:

- Test parameters.
- A cooling profile.

The CPP 5Gs features the following 6 factory-installed cloud point programs:

- 1. D2500
- 2. D5771
- 3. ISO 3015
- 4. IP 129
- 5. NF 60105
- 6. Cloud

In addition to the above, another program is provided for receiving programs transmitted by the PC through the ALAN® network:

- 14. Cloud (PC)

While all parameters in a program are visible, modifications are subject to level 1 (Laboratory) access authorization. To access program parameters and associated temperature profiles, proceed as follows:

Procedure:

Activate ***Environ.*** menu in main level screen 2 (see Chart 4 on the previous page). The following screen is displayed:

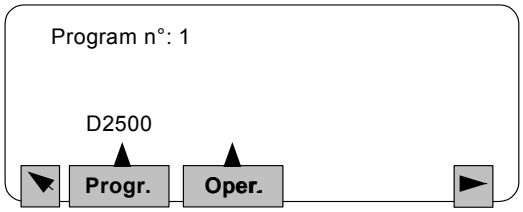


Figure 25: Screen 1 of Program menu

Activate ***Progr***. menu of the ***Environ.*** menu. The following screen is displayed:

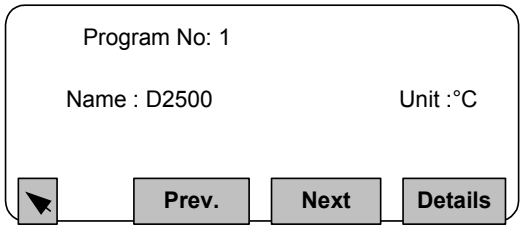
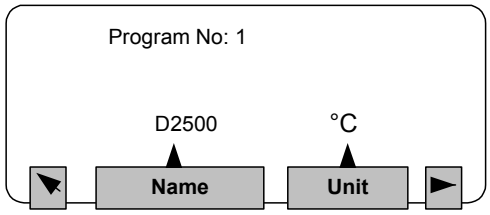
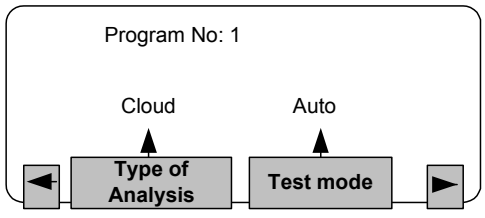
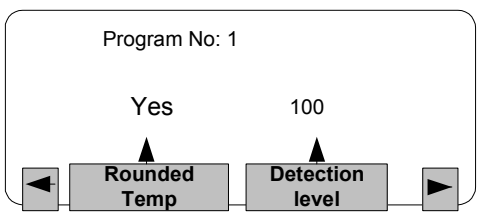
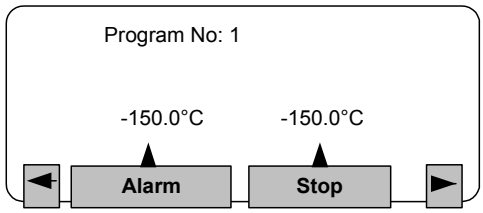


Figure 26: Screen 1 of Program menu

The ***Next*** and ***Previous*** buttons permit scrolling to select a factory-installed program.
On Figure 26 above, No. 1 program has been selected. To view program parameters, press **Details** button. This will permit the following screens to be displayed:

Screen (***Program*** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
 Screen 2, **Program** menu.	Current program is program No 1 ***Name***: name of program selected . In this case, name is D2500 ***Unit***: selection of temperature unit. Temperature is measured in °C.	°C/°F
		Next screen..
 Screen 3,. ***Program*** menu.	***Type of analysis***: type of test selected: Cloud ***Test mode:*** select auto or manual	Cloud/ Pour Auto/ Manual
		Next screen..
 Screen 4 ***Program*** menu.	**Rounded temperature** **Detection levels:** **Default,** Cloud: 100	Yes/No
		Next screen..

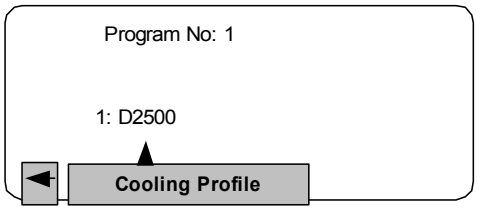


Alarm: Alarm is set off when sample is at desired temperature

Stop: Test stops when sample is at temperature

Screen 5, ***Program*** menu.

Next screen..



Cooling profile: choose cooling profile

Screen 6, ***Program*** menu.

*Table 2: **Progr**. menu screens – cloud method*

Without the required authorization (password), it will not be possible to change the field entries in Program menu screens. This will require access level 1 authorization.

The ***Cooling Profile*** menu gives access to another screen level to view and set up cooling profiles. Each factory-installed program can be associated with a fully customized cooling profile. To view a cooling profile, proceed as explained below. It should however be remembered that changing profile values is subject to level 1 access authorization.

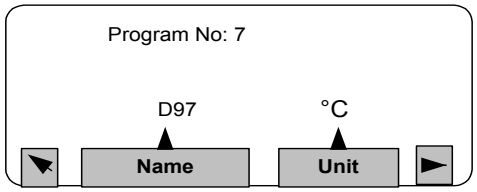
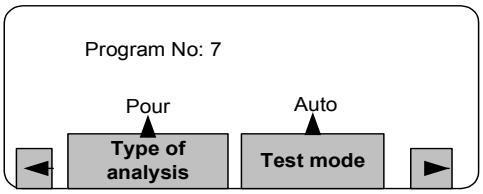
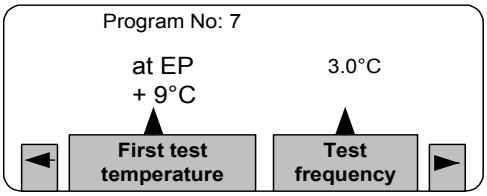
6.2. Test program - pour method

Le CPP5Gs features the following seven factory-installed pour point test programs:

- 7.D 97
- 8.D 5950
- 9.ISO 3016
- 10.IP 15
- 11. NFT-60-105
- 12. RCM (Rapid Cooling Method)
- 15. Pour (PC)

Procedure

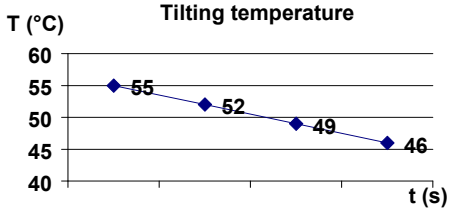
First, activate the **Program** menu of the main level screen 2 (see Chart 4: The **Environ.** menu page 2-43) and select a pour point program using the **Previous** and **Next** buttons. Then, press **Details** button to access the following screens:

Screens (*Program* menu).	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	The program selected is program No. 7 ***Name***: name of program selected ***Unit***: selection of temperature unit. Temperature is measured in °C in this case.	°C / °F
Screen 2, **Progr.** menu		
		Next screen
	***Type of analysis*** : type of test selected. ***Test mode***: select "auto" or "manual". In "manual" mode, no measuring head should be connected	Cloud/Pour
Screen 3, **Progr.** menu		
		Next screen
	***First test temperature***: Used to set the temperature chosen for the first tiling action with respect to the estimated pour point. ***Test Frequency***: Sets the interval between tilting actions at first test temperature.	°C / °F
Screen 4, **Progr.** menu		

Particular case:

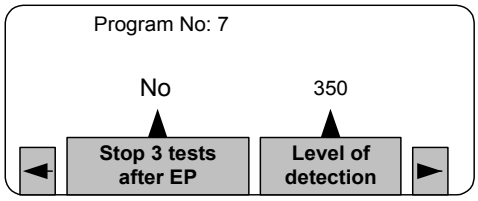
At test starting, if the sample temperature is lower than the temperature of the first tilting test (Ep + 9°C), the first test will be performed at : first test = temperature of the first test (Ep + 9°C) – (x test frequency)

Example :



For a sample for which the Ep is 46°C, if Sample T° = 50°C, the first test is performed at 49 °C.

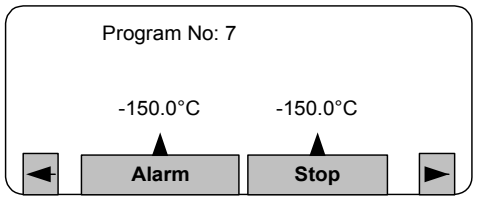
Next screen



Screen 5, **Progr.** menu

Stop 3 tests after EP: If this option is selected, testing will stop after the third unsuccessful tilting following the EP.	Yes / No
Level of detection: The change (in number of points) required at the optical receiver to detect pour point. A value of 350 will detect most products.	0 / 999

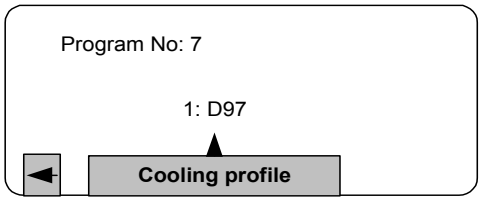
Next screen



Screen 6, **Progr.** menu

Alarm:The operator can select an alarm set-off temperature. A default temperature of -150° C is included in the program.
StopA specific value of end-of-test temperature may be entered. The programmed default temperature is –150° C.

Next screen



Screen 7, **Progr.** menu

Cooling profile: Cooling profile selection.

*Table 3: **Progr**. menu screens – pour method*

6.3.Cooling profile: "Cooling profile" menu

A cooling profile consists of several stages. Each stage is defined by the following statements:

- Type (which cannot be modified from test station).
- Set point.
- Condition for moving to next stage.

Only those stages which have been programmed can be modified. To customize profiles, go back to PC software. When the **"Cooling profile"** is activated, the following screen is displayed:

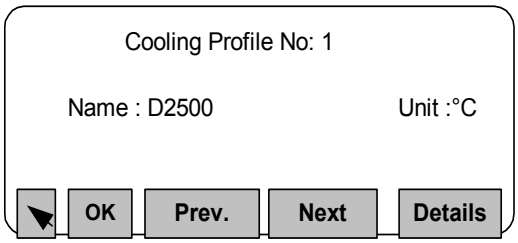
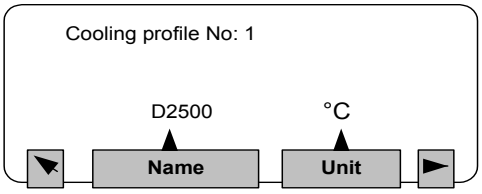
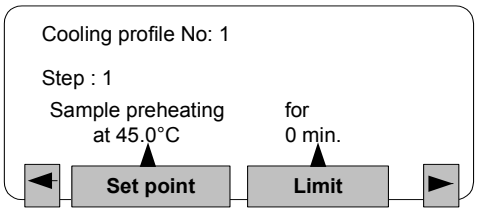


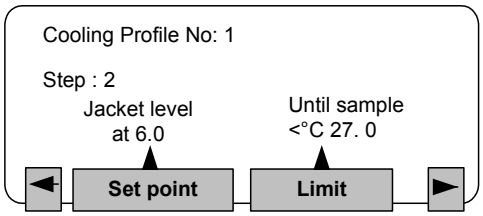
Figure 27: Screen1 of Cooling menu – cloud method

This screen permits selecting a cooling profile from the 15 factory-installed ones, by pressing the **Next** button as many times as necessary and **OK** to validate (subject to the necessary authorizations). In the factory set-up, profile 1 is associated with program 1, profile 2 with program 2, etc. The ***Details*** menu permits viewing the parameters at each profile stage.

6.3.1.Cooling profile – cloud method

Press the ***Details*** key of the cooling profile selection menu in cloud method (Figure 29 above):

Screens (***Cooling profile*** menu.	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	Cooling profile is profile No. 1 (permanent field). ***Name:*** profile name selection ***Unit***: temperature unit selection. Unit should be consistent with that in associated program.	°C/°F
Screen 2, ***Cooling profile*** menu		
		Next screen
	Stage 1 Sample preheating ***Set point***: sample heating temperature ***Limit:*** heating time in minutes after reaching set point. 0 min means no heating.	
Screen 3, ***Cooling Profile*** menu		
		Next screen

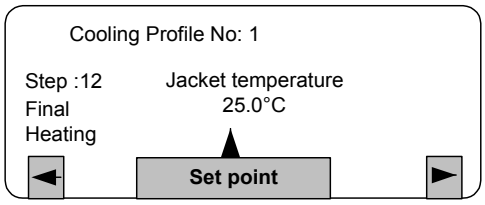


Stage 2
First cooling stage of cloud test point.
Set point: jacket cooling stage set point.
Limit: sample temperature limit before switching to next jacket cooling stage.

Screen 4, ***Cooling profile*** menu

Nine screens identical to the above are displayed in succession, representing the jacket cooling stages provided for in the standards listed in paragraph 2.5 - Programmed temperature profiles page 1-30.

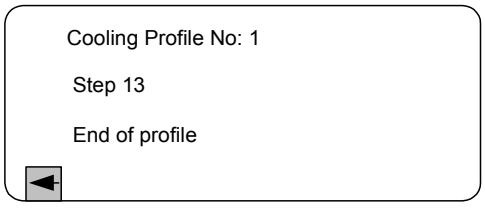
Next screen



Step 12
Set: **point**: jacket temperature set point for new test

Screen 14, ***Cooling Profile*** menu

Next screen



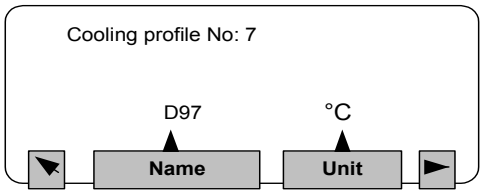
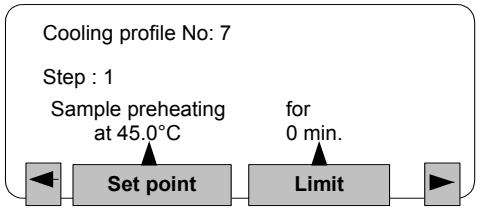
Step 13
End-of-profile screen - Common to all profiles.

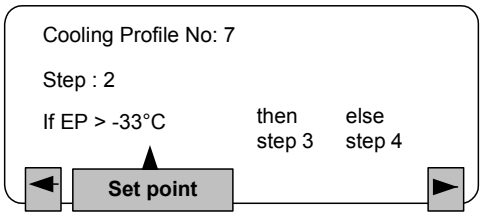
Screen 15, ***Cooling Profile*** menu

Table 4: Cooling Profile – cloud method

6.3.2. Cooling profile – pour method

Press the ***Details*** key of the cooling profile selection menu in pour method (after having activated the cooling menu, screen 7 of the ***progr.*** menu, Table 3 page 2-47), the following screen is displayed:

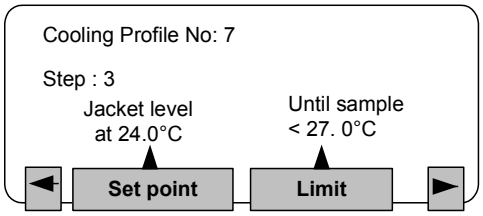
Screens (***Cooling profile*** menu.	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	Cooling profile is profile No. 7 (permanent field). ***Name***: profile name selection ***Unit***: temperature unit selection. Unit should be consistent with that in associated program.	°C/°F
Screen 2, ***Cooling*** menu		
Next screen		
	Stage 1 Sample preheating ***Set point***: sample heating temperature ***Limit:*** heating time in minutes after reaching set point. 0 min means no heating.	
Screen 3, ***Cooling*** menu		
Next screen		



Stage 2
Set point: presumed pour end point temperature value.
If the pour end point presumed temperature is above –33°C (EP>-33°C), program step 3 is carried out, then step 5. Otherwise, program will carry out step 4 then step 5.

Screen 4, ***Cooling*** menu

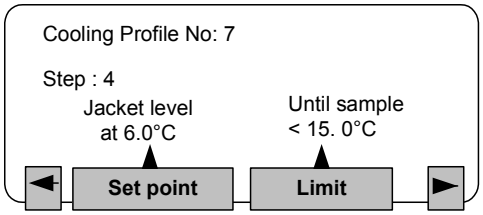
Next screen



Stage 3
First cooling stage of pour point test for EP> -33°C.
Set point: jacket cooling temperature set point.
Limit: sample temperature limit before switching to next jacket cooling stage, step 5 (following 7 screen).

Screen 5, ***Cooling*** menu

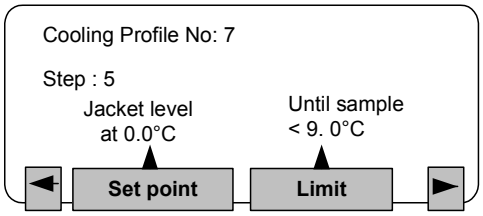
Next screen



Stage 4
First cooling stage of pour point test for EP≤ -33°C.
Set point: jacket cooling temperature set point.
Limit: sample temperature limit before switching to next jacket cooling stage, step 5 (following 7 screen).

Screen 6, ***Cooling*** menu

Next screen

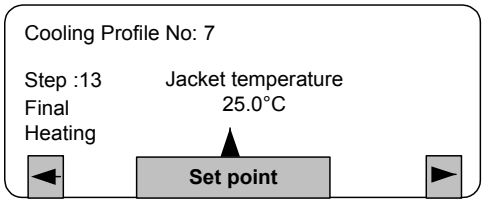


Stage 4
Second cooling stage of pour point test.
Set point: jacket cooling temperature set point.
Limit: sample temperature limit before switching to next jacket cooling stage.

Screen 7, ***Cooling*** menu

Four screens identical to the above are displayed in succession, representing the jacket cooling stages provided for in the standards listed in paragraph 2.5 - Programmed temperature profiles page 1-30.

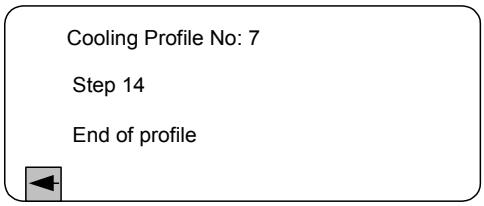
Next screen



Step 13
Set: **point**: jacket temperature set point for new test

Screen 15, ***Cooling Profile*** menu

Next screen



Step 14
End-of-profile screen - Common to all profiles.

Screen 16, ***Cooling Profile*** menu

Table 5: Cooling Profile – pour method

6.4.Operator name list

Press the ***Operator*** key in the ***Run Environment*** menu to display the prestored list of operator names (up to 10), the following screen is displayed:

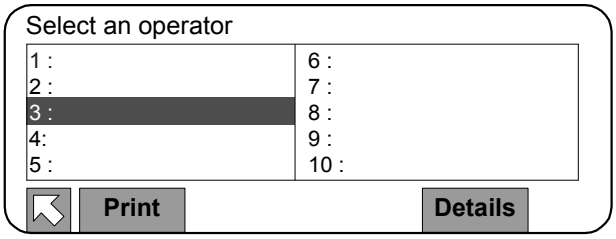


Figure 28 : Run Environment menu screen - List of operator names

The ***Operator*** menu screen contains the following menus:
Print : to print the list of operator names
Details : to get to the operator name setup menu

The ***Print*** menu lets you print out the list of operator names. Press the ***Print*** key to start printing immediately.
Select a prestored operator name if you wish to modify it or select a free field if you wish to store a new operator name. Press the ***Details*** key, the « Operator » text entry screen is displayed. Enter the name (refer to the section 2.6.1 page 1-31 for further details on using the text entry screen) then press ***OK*** to confirm.

7.Measurements and diagnostics: "Service" menu

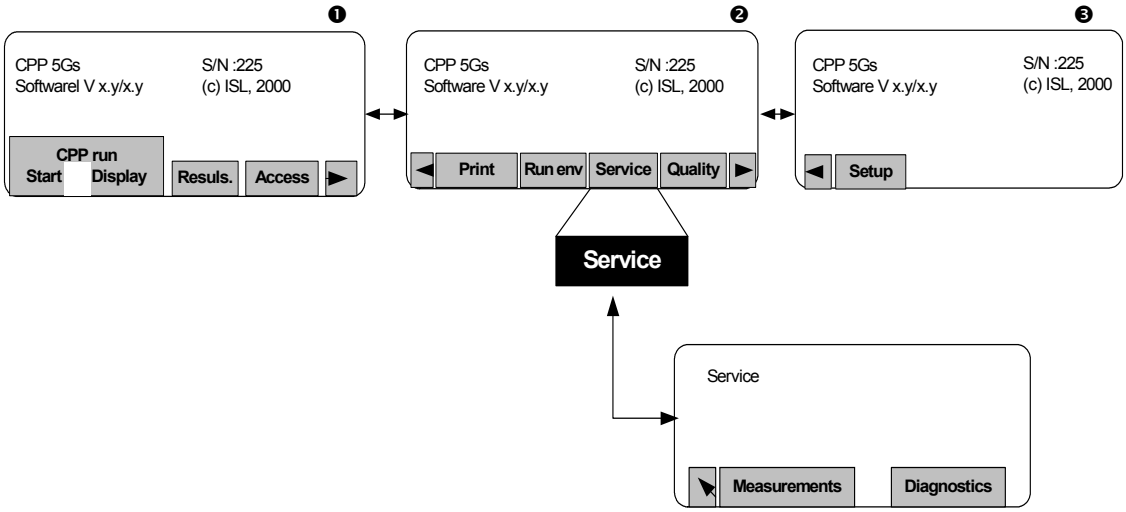


Chart 2: "Service" menu

The ***Service*** menu is largely devoted to servicing. It permits:

- Displaying measurement data.
- Performing diagnostics on Analyzer major components.

7.1.Service menu

Activating the ***Service*** menu displays the following screen:

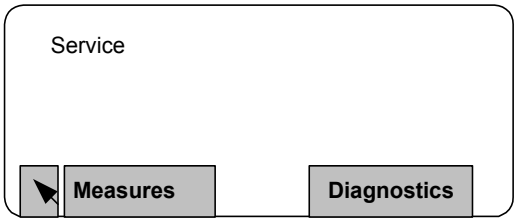
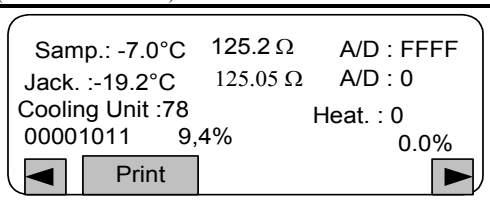
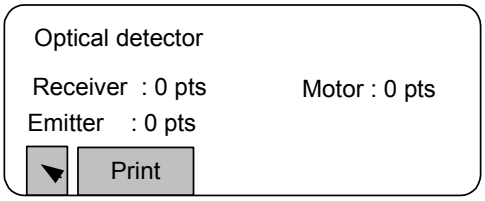


Figure 29: Service menu screen

The ***Measurements*** menu (in ***Service*** menu) gives access to the following data, distributed over two screens:

Screens (***Measurements*** menu)	**Purpose of menu** (From left to right and from top to bottom respectively)
	***Samp***. : sample temperature(°C). resistance sample probe (Ω). ***Jack.*** : jacket temperature (°C) jacket probe resistance. (Ω). ***A/D*** :analog/digital conversion ***Cooling unit*** : cooling, percent. ***Heat***: heating, percent. ***Print***: print both screens.
Screen 1, ***Measurements*** menu.	
	Next screen



Optical detector
Receiver: number of points received.
Emitte: number of points transmitted.
Motor: Number of points fed to motor

Screen 2, ***Measurements*** menu.

Table 1: ***Measurements*** *menu screens.*

7.2.Diagnostic menu

Access to the ***Diagnostics*** menu is subject to level 2 access authorization (service).

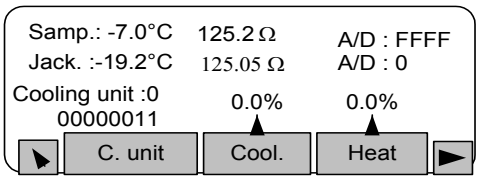
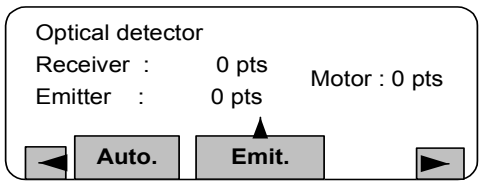
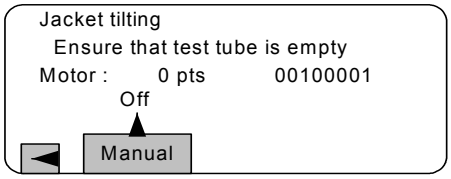
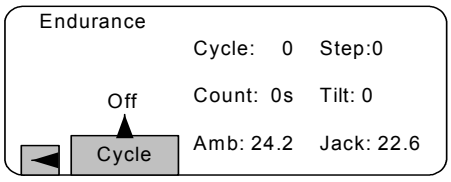
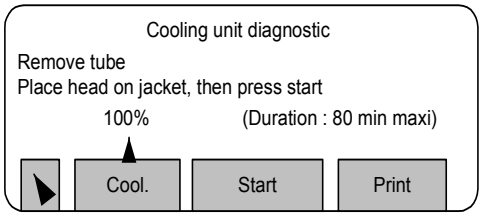
Screens (***Diagnostics*** menu).	**Purpose of menu** (From left to right and from top to bottom).	**Field entry**
 Screen 1, ***Diagnostics*** menu	Top of screen: see Table 4. ***C. unit***: access to the cooling diagnostic menu (see next section). ***Cool:***. :enter cooling percent. **Note**: The analyzer may lower the power entered to limit vibrations ***Heat***: enter heating percent	
		Next screen
 Screen 2, ***Diagnostics*** menu	Optical detector. ***Emitter***: number of points emitted. 0 pts: no light emission. 4095 pts: maximum light emission **Receiver**: number of points received: 0 pts :no light received. 4095 pts : maximal light received ***Auto***: emitter servo-control to obtain a given number of points at receiver(≈2000 pts) ***Emit***: enter manually the number of points to be emitted.	0 → 4095 pts (max. emission) 0 → 4095 pts
		Next screen
 Screen 3, ***Diagnostics*** menu	***Motor points***: conversion of points to volts to specify drive power 0 0 1 0 0 0 0 1 Bit 0 = 1 : vertical position Bit 1 = 1 : horizontal position Bit 4 = 1: Cloud head connected Bit 5 = 1 : Pour head connected	
Before controlling motor manually, disconnect the measuring head and verify that the tube is empty.		
 Screen 4, ***Diagnostics*** menu	Cycle: Starting an endurance test for cooling unit	

Table 2: ***Diagnostic*** *menu screens*

7.3.Cooling unit diagnostic

Before starting cooling unit diagnostic, remove test tube and place covering head on jacket. Diagnostic procedure may take up to 80 minutes.

Screens (***Cooling unit*** menu)	**Purpose of menu** (From left to right and from top to bottom respectively)
 Cooling Unit Diagnostic screen (Diagnostic menu)	***Cool***: diagnostic temperature ***Start*** : diagnostic initialization ***Print***: print diagnostic data

The cooling unit diagnostic is carried out in three stages:

1. Initialization: heating to 40° C and temperature regulation for 3 min.
2. Cooling: cooling to –110° C. During this phase, the program records the data relating to certain significant temperatures (time to reach significant temperature, number of points actually applied.
3. Heating: return to room temperature.

The ***Print***. button permits printing cooling unit characteristic data (in addition to data recorded in phase 2 above), which may be sent to ISL's Customer Service Dept. for an assessment of cooling unit condition.

8.Calibration: "Quality" menu

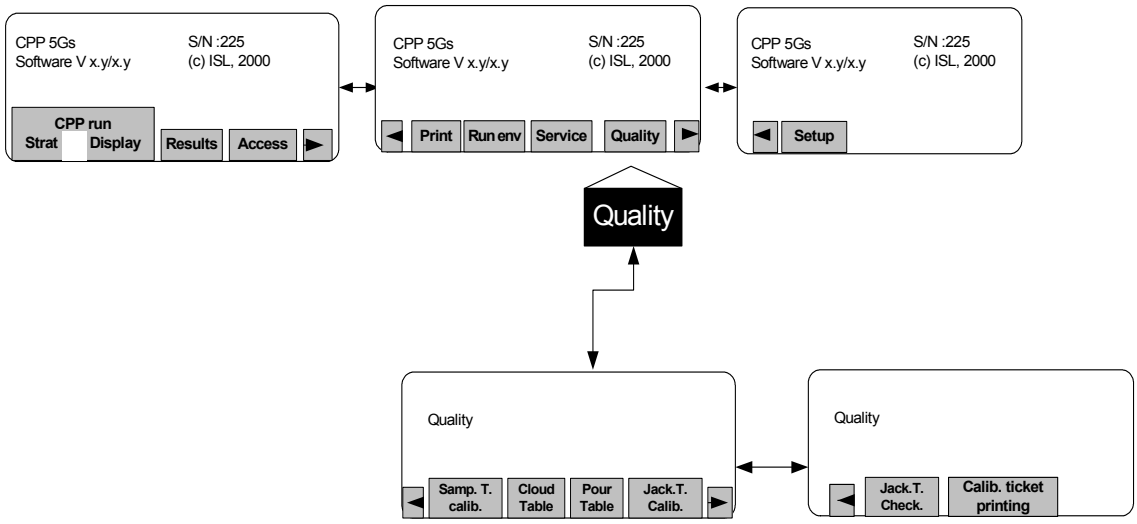


Chart 6 : Quality menu

Calibration of CPP 5Gs measuring instrumentation is occasionally required. Although calibration intervals are the user's decision, it is recommended to calibrate all measuring instruments at least once yearly. The **Quality** menu comprises a series of sub-menus, grouped in the following screen, which covers the following calibration steps:

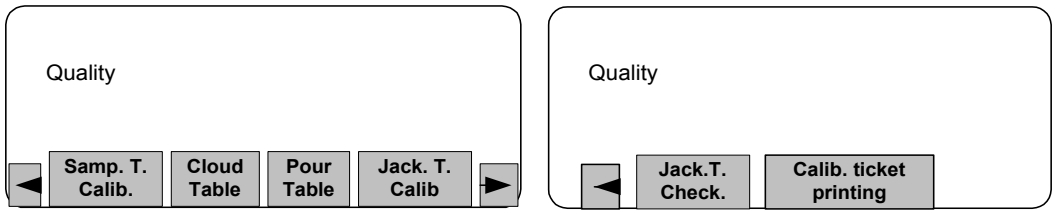


*Figure 30: **Quality** menu screens*

- ***"Sample T calib"***: calibration of sample temperature measurement.
- ***"Cloud Table"***: correction table for the sample temperature probe in "cloud" mode.
- ***"Pour Table"***: correction table for the sample temperature probe in "pour" mode.
- ***"Jack T calib"***: calibration of jacket temperature measurement.
- ***"Jack.T.Check"***: checking procedure for jacket temperature measurement

The ***Calib. Ticket.Printing*** menu can be used for printing calibration data (refer to the Appendix A section 3 - 80-column calibration ticket printout page 77 for a printing example).

8.1.Sample temperature measurement calibration: "Sample Temp Calib." menu

Sample temperature measurement is calibrated using the ***"Sample Temp. Calib."*** menu. The calibration procedure is as follows:

Procedure:

1. Disconnect probe DIN connector.
2. Plug probe simulator connector into probe socket (see list of spares).
3. Activate **"Sample Temp. calib**." menu.
4. Follow the guidance provided by the following screens:

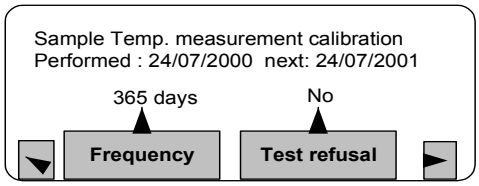
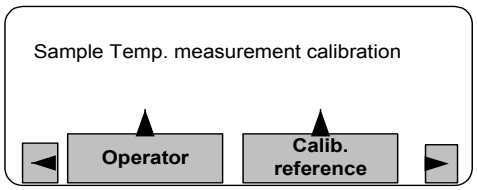
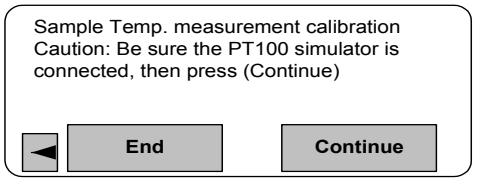
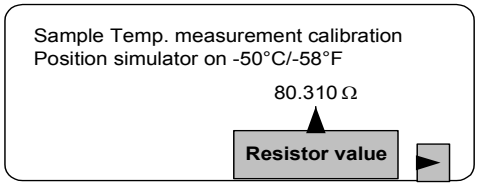
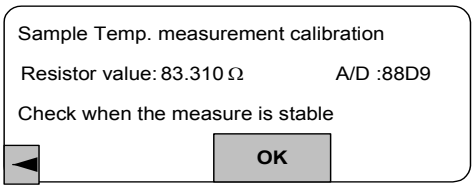
Screens (***Sample Temp. alib***. menu).	**Purpose of menus** (From left to right and from top to bottom respectively).	**Field entry**
	***Frequency***: calibration intervals. 0 days means there is no check on the next calibration date being past. ***Test refusal***: start test. Refused when missing the date set for the next calibration.	0 → 365 days Yes /No
Screen 3, ***Sample Temp. calib.*** menu		
		Next screen
	***Operator***: name of operator performing the calibration. ***Calib. reference***: calibration reference data.	Chain list Chain list
Screen 2, ***Sample Temp. calib.*** menu.		
		Next screen
	***End***: cancel calibration. Return to screen 1 of ***"Sample Temp. calib."*** menu. ***Continue***: when calibration is underway, it cannot be cancelled. Front panel keys are inoperative.	
Screen 3, ***Sample Temp. calib.*** menu		
		Next screen
	Set simulator thumbwheel to -50°C/-58°F. ***Resistor value***: Enter resistor value in Ohms if required.	
Screen 4, ***Sample Temp. calib.*** menu		
		Next screen
	When display is practically stable (the first three characters of the A/D conversation are stable), press ***OK*** to validate.	
Screen 5, ***Sample Temp. calib.*** menu		
Proceed as above, setting simulator thumbwheel to +50° C/1322° F. When operation is completed, the instrument displays screen 1 of the **Quality** menu		

Table 3: ***Sample Temp. calib. menu*** *screens*

8.2.Probe correction chart: "Cloud table" and "Pour table" menus

The "Cloud table" and "Pour table" permit entering a correction table for the sample temperature probe according to the detection point mode selected. The sample temperature displayed is as corrected on the basis of the table (at standstill, during test and during calibration).

The sample probe is a Pt 100 platinum probe as per standard IEC 51-Class A. It is delivered with an ISL Quality Certificate showing the temperature discrepancy at 40° C (discrepancy = Value – Reference t°) ° C).

When a **"Cloud table"** or **"Pour table"** menu is activated, the following menu is displayed:

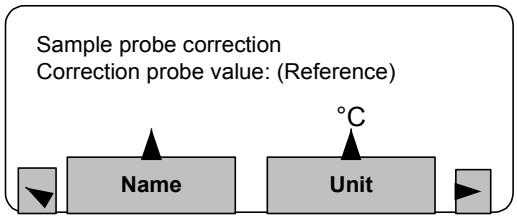


Figure31: Screen 1 of "Cloud Table" menu

This screen permits entering correction table ID and selecting the table temperature unit. Corrections can be entered through a series of screens similar to the above (correction = probe reading – reference value) in a temperature range from –150° C (-238° F) to +60° C (140° F) (with a 10° C increment):

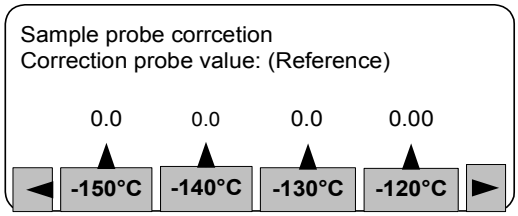


*Figure 32: Screen 2 of **Sample Probe Correction** menu.*

8.3.Jacket temperature measurement calibration: "Jacket Temp. Calib." menu »

It is preferable to calibrate jacket temperature after sample temperature (see previous paragraph). There are two ways to calibrate jacket temperature:

1. Automatically, using the sample probe.
2. Manually, using a calibrated thermometer.

Actually, the CPP 5Gs computes the difference between the temperature as shown by the sample probe and the jacket temperature. If the latter is too high, the instrument will consider calibration to be bawd on an external calibrated thermometer. In that case, it will wait until a reference value has been entered before it moves to the next stage.

Procedure:

Follow the indications of the screens shown in the following table:

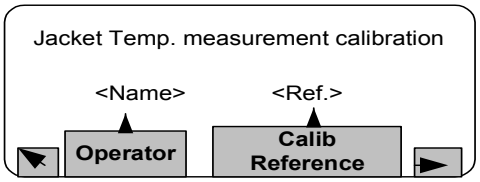
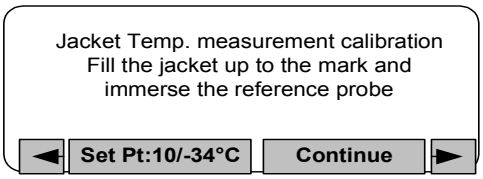
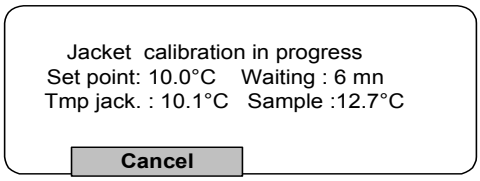
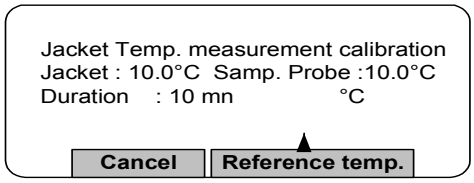
Screens (***Jacket Temp. calib.*** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).
	***Operator***: name of the operator performing the jacket temperature probe calibration. ***Calib. Reference***: calibration operation reference.
Screen 1, ***Jacket Temp. Calib.*** *menu*	
	Next screen
	Fill jacket with methanol up to the mark visible on the inner wall. Select the two calibration temperatures. ***Set point: 10/-34°C*** or ***Set point: -34/-51°C*** : cooling stages ***Continue***: next step in the procedure.
Screen 2, ***Jacket Temp. Calib.*** *menu*	
	Next screen
	***Set point***: select the two calibration points ***Waiting***: waiting time for jacket to cool off ***Tmp jaq***. : jacket temperature ***Sample***: sample temperature. ***Cancel***: stop calibration procedure (this is the only way to stop the operation)
Screen 3, ***Jacket Temp. Calib.*** *menu*	
	Next screen
	***Jacket***: jacket temperature. ***Samp. probe***: sample temperature ***Duration***: time for sample temperature to stabilize. During that time, the operator may enter the reference temperature ("Reference temp." field). If the sample probe is used, the CPP 5Gs will automatically set the sample temperature shown on the screen. ***Cancel***: stop calibration procedure ***Reference temp.***: sample temperature -as read off thermometer. –or as measured by probe .
Screen 4 ***Jacket Temp. Calib.*** *menu*	
Proceed as above for the second stage (-34.0° C)	

Table 4: **Jack. Temp. Calib***. menu screens*

On completion of the procedure, the CPP 5Gs heats the jacket to +25°C

8.4.Jacket temperature measurement checking: the “Jack.T.Check." menu

Jacket temperature measurement is checking manually using a reference thermometer or probe.

Procedure:

Follow the indications of the screens shown in the following table:

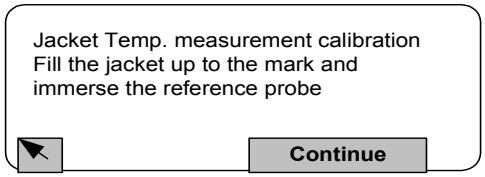
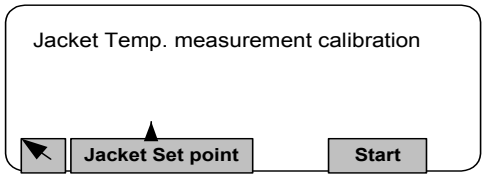
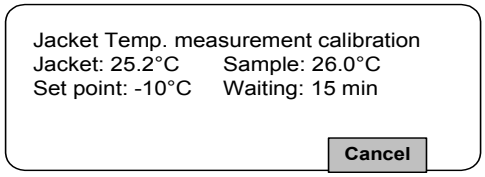
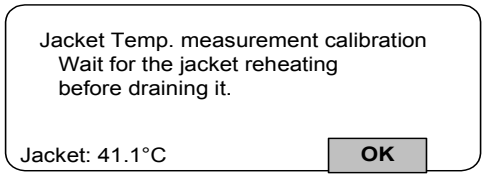
Screens (***Jacket T. Check.*** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).
	***Continue***: start the checking procedure after having filled the jacket and positioned the reference probe or thermometer.
*Screen 1, **Jacket T. Check.** menu*	
	Next screen
	***Jacket Set point:*** enter the jacket set point temperature. ***Start***: the CPP 5Gs controls the jacket cooling up to the set point temperature.
Screen 2, Jacket T. Check. menu	
	Next screen
	***Cancel***: stop the jacket temperature checking procedure. Go back to the main level of the ***Quality*** menu (Figure 30 page 2-55).
Screen 3, Jacket T. Check. menu	
	Next screen
	***OK***: Go back to the main menu level after having drained the jacket and removed the reference probe.
Screen 4 Jacket T. Check. menu	

Table 5: **Jack. Temp. Calib**. *menu screens*

If the jacket set point temperature entered does not correspond to the temperature measured by the reference thermometer or probe, carry out the jacket temperature measurement circuit calibration (refer to the section 8.3 page 2-57).

9.Alarm treatment

9.1.Types of alarm

9.1.1.Failure alarms

The failure alarms warn the operator in the event of a malfunction.
Failure alarm detection has at least one of the following consequences:

- A test cannot be started,
- A test in progress is stopped,

These failures set off a continuous audio alarm and the red LED of the **ALARM STOP** key lights up on the keypad (see the section 6.1.3 page 1-21). Press the **ALARM STOP** key to display the alarm message and acknowledge it or not. The red LED stays on for as long as the failure persists, even if the alarm has been acknowledged.
The failure alarms and the corresponding message are shown in the section 0 page 2-64.
The limits of certain of these failure alarms can be set (refer to the section 10.2 - Alarms setup: "Alarms setup" menu page 2-63).

9.1.2.Warning alarms

The warning alarms warn the operator of an expected event: " End of test (cloud and pour)" for example.
They are accompanied as for them by a discontinuous audio alarm (the signal modulation width is adjustable; refer to the section 10.2 - Alarms setup: "Alarms setup" menu page 2-63). The red LED on the **ALARM STOP** key lights up on the keypad. It goes off when the alarm is acknowledged.
The warning alarms and the corresponding message are shown in the section 10.2.3 page2-65.

9.2.Displaying alarms, stopping the buzzer

When an alarm is triggered, press the **ALARM STOP** key to display the cause. The following screen is displayed:

Figure 33: Alarms displaying screen

The alarms screen display contains the following **menus** and **buttons**:

- ***Exit***: to go back to the previous screen without acquitting the alarm.
- ***Acquit***.: to acquit the alarm and to go back to the previous screen.
  Press the ***Acquit*** key to stop the buzzer and return to the previous screen. Note that the red LED on the **ALARM STOP** key stays on for as long as the default persists, even if the alarm has been acknowledged.
- ***Review***: to display the alarm historical.

9.3.Alarm processing

Certain alarm cases present a danger. This is why most default settings switch the Analyzer into idle status, thus the cooling unit is cut out.
However, this is not to say that this type of apparatus is hazard-free or that if the Analyzer fails to go into idle status the operator and/or Analyzer are not in danger. It is important always to check what is going on whenever an alarm is triggered.

Attention! Generally when the alarm buzzer is triggered, the operator must display the cause and ensure that everything is working correctly.

For example, owing to a faulty component an alarm that normally should place the apparatus in idle mode fails to do so. In that case, the operator must intervene by switching off the analyzer.

9.4.Alarm historical

The CPP 5Gs can register up to 16 alarm messages.

Activate the ***Review*** menu from the alarm displaying screen (see Figure 33 page 2-60), the following screens appear:

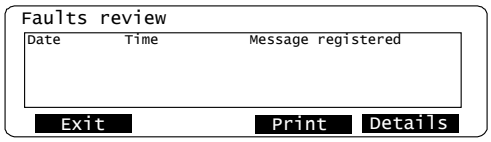
Displays (***Review*** menu of the Alarm displaying screen)	**Meaning of different menus** (Going from left to right and from top to bottom).	**Field values**
	Faults review : permanent field ***Exit:*** To go back to the alarms displaying screen ***Print:*** To print the complete alarms review ***Details:*** To display the detailed alarm message	
Display 1 of the ***Review*** menu		
Press the ***Details*** key to access to the detail displaying screen of the alarm selected:		
		Next Display
	Date: date at which the failure occurs *Src:* state of the analyzer when the alarm occurs	Status: Idle, Running, Jacket preparation, Cleaning, Diagnostic
Details display the ***Review*** menu	*Def:* alarm message displayed ***Exit***: to go back to the alarm displaying screen	

Table 6: Screens of ***Review*** menu of the alarms displaying screen

10.Configuration: "Setup" menu

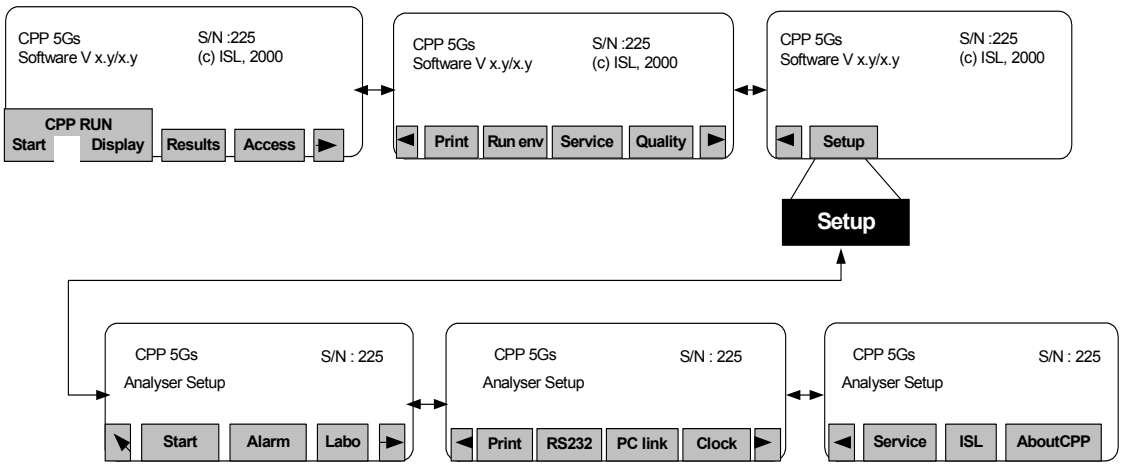
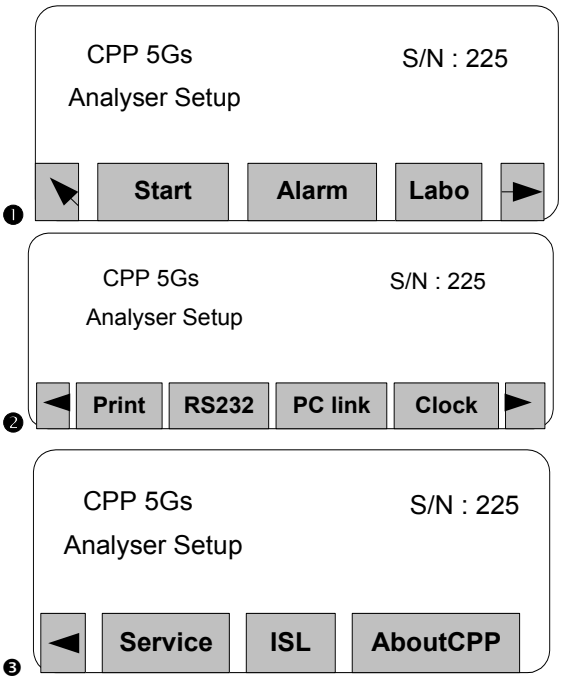


*Chart 7: **Setup** menu*

The "working environment" of the CPP 5Gs is fully configurable. It features facilities for setting up test programs, causing the actuating or interruption of alarms on the occurrence of specific errors, and many other parameters which will now be described.
The CPP 5Gs is configured through the ***Setup*** menu at main screen level (see Figure 15: The three main level screens with access level 1 or higher page 2-36). On activation of the ***Setup*** menu, the following screen is displayed:



The above screens give access to the setup parameters described below.

10.1.Power-on parameters: "Start" menu

The ***Start*** menu permits selecting the cloud point test program, the pour point test program (according to the type of measuring head connected) and the authorized access level after switching on the analyzer.

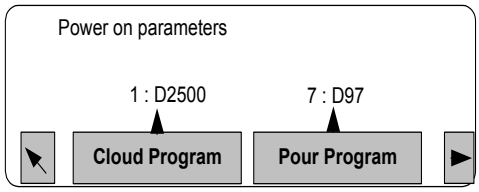
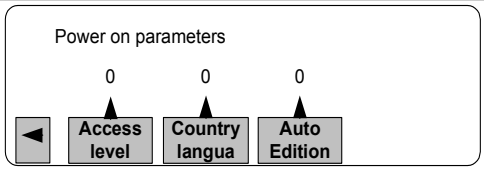
Screens (***Start*** menu)	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	***Cloud progr.***: select cloud program. ***Pour program***: select pour program ***Note:*** When analyzer power is on, "cloud" or "pour" program is automatically loaded as the test program on connecting the appropriate head	1 → 5 1 → 2
*Screen 1, **Start** menu*		
		Next screen
	***Access level*** : choice of default access level when the device is switched on. ☞ ***: It should be noted that only the current access level or lower access level can be chosen.***	0, 1 or 2
Screen 2, ***Start*** *menu*	***Country language***: choice of language selected by default (locked). "Selection" allows the operator to choose the language.	Selection/ English/ Français
	Auto Edition : characters number needed to activate the auto edition (0 inhibits the function).	0 → 9

*Table 6: **Start** menu screens.*

10.2.Alarms setup: "Alarms setup" menu

10.2.1.Programming the audible alarm

This menu permits setting and testing the time and modulation of intermittent audible alarm triggered in case of warning alarm. Activating the menu displays the following screen:

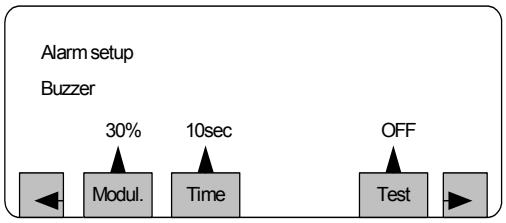


Figure 34: Screen 1 of Alarm setup menu

This screen permits setting alarm as a warning device, while not preventing the **ALARM STOP** button LED from lighting up. It should be remembered that pressing the button permits viewing the error message.

Setting the modulation of intermittent alarms is performed through the **Modulation** button (100%: continuous alarm, 0%: alarm muting). The ***Time*** button permits setting the warning alarm time.
The **Test** button is used for testing the alarm following a modulation change.

Warning and alarm signals, with the relevant messages, are listed below.

10.2.2.List of failure alarms and setting

Failures are indicated through the red LED and the buzzer.
Failure alarm acknowledgement will stop the buzzer, but the red LED will remain on as long as the failure has not been cleared.

Failure	Failure detection and additional information	Effect
Software memory (Prom)	Check on power up by calculation and checksum comparison.	Prevents testing .
Dta memory (Ram)	Check on power up by writing and reading .	Prevents testing.
Safe memory (NVM)	Check on power up by checksum calculation and comparison with stored checksum value.	Inhibits analyzer operation by requesting internal parameter reloading.
Low battery	Permanent check. The battery is used when analyzer power is off to run the clock and save RAM-stored parameters. When a fault is detected, save internal parameters using the downloading menu, then turn the instrument off and replace battery.	
Signal conditioning (AD Cnv)	Permanent check on interchange with A/D converter.	Prevents testing and stops test in progress
Optical detector	Check at end of light servo-control cycle. Fault is detected as strong emission/weak reception or weak emission/strong reception. Thresholds are not programmable. Alarm is deleted when starting each test.	Stops test In progress
Motor	Check during test when tilting sample (pour point). Fault is detected when tilting from vertical to horizontal position (or vice versa) takes longer than the specified time, e.g. when system is stalling.	Stops test in progress.
Cooling circuit	Permanent check. Fault is detected when jacket temperature drops by less than 1° C in 5 min. with cooling requirement in excess of 90%. Thresholds are not programmable. Alarm is deleted when starting each test.	Will not stop test in progress.
Heating circuit	Permanent check. Fault is detected when jacket temperature rises by less than 1° C in 5 min. with heating requirement in excess of 90%. Thresholds are not programmable. Alarm is deleted when starting each test..	Turns off heating and stops test in progress.
Sample temperature safety	Check during test. Fault is detected if sample temperature is outside limits after registering period. Two programmable thresholds in °C. Lower threshold (-threshold), Upper threshold (+threshold), registering time in seconds Limits: (-) Threshold: -150° C to +75° C (+) Threshold: -150° C to +75° C Time: 0 to 120 seconds. Default values : (-) Threshold : -150° C (+) Threshold : +55° C Time : 30 seconds Alarm is deleted when starting each test	Stops test in progress.
Jacket temperature safety	Check during test. Fault is detected if sample temperature is outside limits after registering period. Two programmable thresholds in °C. Lower threshold (-threshold), Upper threshold (+threshold), registering time in seconds Limits: (-) Threshold: -150° C to +55° C (+) Threshold: -150° C to +55° C Time: 30 seconds. Alarm is deleted when starting each test..	Stops test in progress
Run start not allowed	Alarm issued only when test is controlled form PC. This alarm is not displayed when testing is controlled from work station, but messages in plain language are displayed on the screen. Permits notifying problems to PC. Possible problem type: presence of alarms which inhibit testing. Alarms is deleted when starting each test.	
Sample probe	The analyzer has detected the change of the measuring head during the test.	Stops test in progress.
Cooling unit temperature safety	Turn analyzer off. Clean air intake filters. Turn analyzer on. If problem persists, contact ISL's Customer Service Department	

Cooling unit stroke control safety	Contact ISL's Customer Service Dept.
Cooling unit board link safety	Turn analyzer off. Turn analyzer on again. If the problem persists, contact ISL's Customer Service Dept.

Table 7: The alarms and their possible effects

10.2.3.List of warning alarms

Warning alarms are given by the red LED and the intermittent buzzing. Acknowledging a warning signal will stop the buzzer and turn off the LED.

Warning signal	Additional information
End of run: CPP	Results are stored ➔ xx.x° Warning signal is deleted when starting each test.
End of run: stop temperature	Sample temperature exceeds "stop" temperature entered in test program. The result is not stored. Warning signal is deleted when starting each test.
Sample temperature reached	Sample temperature is compared with alarm temperature entered in test program (see chapter 6 page 2-43). Warning signal issued when sample temperature is lower (outside of pre-heating period). The result is not stored. Warning signal is deleted when starting each test.
End of run: 3 tests after EP	Indicates end of third and last test programmed beyond estimated temperature if the option is activated, as explained in chapter 6.2 page 2-46. The result is not stored.
End of run: end of cooling profile	The last stage of the cooling profile has been reached and completed before the cloud and pour points have been determined. The result is not stored.
End of run: detection 1st tilt	Pour point is detected on the first tilting from vertical to horizontal position. The EP is not correct (refer to the chapter 6.2 page 2-46). The result is not stored.
End of reheating	The sample temperature reaches the final heating value of the cooling profile.

Table 8: Warning signals

10.3. *Customizing and access authorization to level 1: "Laboratory setup" menu*

The CPP 5Gs can be customized to incorporate the names of the owner laboratory and its supervisor. The supervisor may restrict access (write protection) to certain parameters (e.g., those associated with standards). Activating the « **Laboratory setup"** menu permits displaying the following screens:

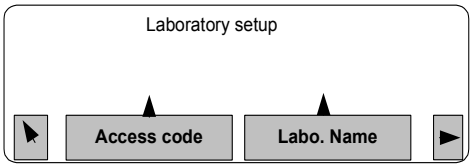
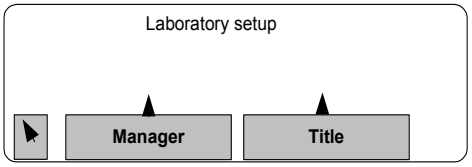
Screens (**Laboratory setup** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
 Screen 1 of **Laboratory setup** menu	**Access code**: access code to level 1. **Name of laboratory**: : name of laboratory operating the CPP 5Gs	-32768 → 32767 Chained llist
		Next screen
 Screen 2 of **Laboratory setup** menu	**Manager**: name of laboratory supervisor. **Title**: title of laboratory supervisor.	Chained list Chained list

*Table 9:**Laboratory setup** menu screens.*

10.4. *Printer setup: "Print" menu*

Printer setup is covered in section 5.6 - Printer setup page 2-42.

10.5. *CPP 5Gs ⇔ PC: "PC link setup" and "RS 2332 link setup" menus*

The CPP 5Gs is , in more ways than one, an "open" piece of equipment. In addition to being fully open to parameter changes, it can communicate with a PC through the following facilities:

- ALAN® network: the network's input and output ports are located at the back of the analyzer.
- RS 232 C link.
- Service port (at back of analyzer).

Each of the above communication facilities has a specific application. Thus:

- The ALAN® network permits, if required, linking several CPP 5Gs analyzers together and controlling them from one PC.
- The RS 232 C link permits transmitting test results to a PC.
- The parameters associated with each of the above communication modes are described below..
- The "service" port is used for downloading control software, screen/printer texts and internal parameters.

10.5.1.RS 232 C link configuration: "RS 232 C link setup" menu

If the RS 232 link is chosen for communication purposes, it will be necessary to use the appropriate adapter delivered with the analyzer. One side of the adapter connects to the ALAN® network input and output at the same time to provide a series port. With the adapter connected, the instrument automatically detects the presence of a RS 232 link.
Upon detection of the RS 232 adapter:

- Th RS 232 link is declared "on line"
- The RS 485 link is declared "out of service".

The parameters associated with this link are shown in the following table:

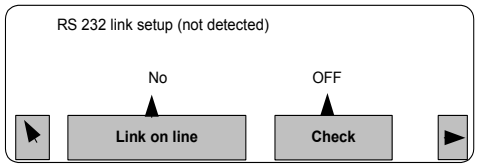
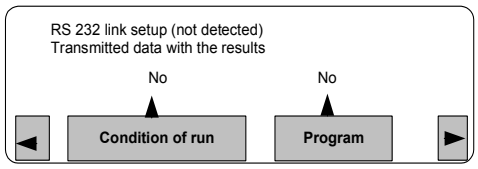
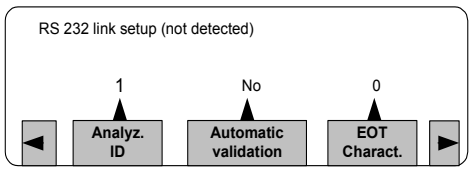
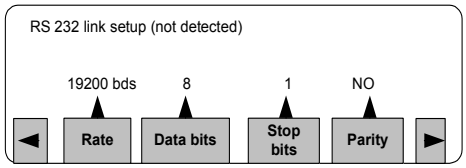
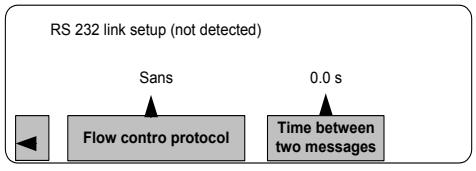
Screens (**RS 232** link setup).	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field Entry**
	**Link on line**: link. set up **Check**: transmission of link test frame: <(ISL CPP 5G)DB>	Yes/No ON/OFF
Screen 1 of **RS 232 link setup** menu.		
		Next screen
	Data transmitted with the result: **Condition of run**: test particulars (e.g., name of operator, pressure unit **Program**: test program used	 Yes/No Yes/No
Screen 2 of **RS 232 setup** menu.		
		Next screen
	**Analyzer ID**: analyzer identification number. **Automatic validation** :automatic transmission of results at end of test. **EOT character**: End of Transmission Character (ASCII code)).	 Yes/No Chained list
Screen 3 of **RS 232 setup** menu.		
		Next screen
	**Rate,** bauds **Data bits**: data bits. **Stop bits**: stop bits. **Parity**: parity.	110/200/ 600/1200/ 2400/4800/9600/ 19200 bds 7/8 1/2 None/Even/Od d
Screen 4 of **RS 232 setup** menu.		
		Next screen
	**Flow control protocol**: data flow control protocol. **Time between 2 messages**: when there is no transfer protocol.	None RTS/CTS Xon/Xoff ENQ/ACK 0 →10s
Screen 4 of **RS 232 setup** menu.		

*Table 10: **RS 232** link setup menu screens.*

10.5.2.PC link configuration: "PC link setup" menu

The **PC link setup menu** permits viewing or setting analyzer CPP 5Gs identification data (name, address) on the ALAN® network. If the RS 232 is not detected:

- The RS 485 PC link is declared "on line"
- The RS 232 link is declared "out of service".

Upon activation of the ***PC link*** setup menu, the following screens are displayed:

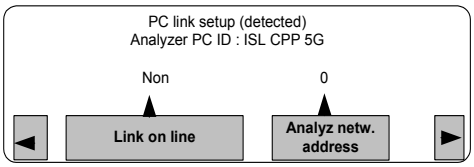
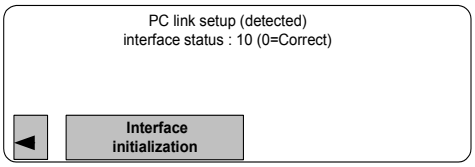
Screens (**PC link setup** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	PC link setup (permanent field). Analyzer PC ID **Link on line**: status of link between the CPP5Gs and PC. **Analyzer network**: address of CPP 5Gs on ALAN® network	 Yes/No 1 → 31
Screen 1 of **PC link setup** menu		
		Next screen
	Link status: error code to identify errors related to CPP5G⇔PC interface. **Interface initialization:** initialization of CPP5G⇔PC interface.	
Screen 2 of **PC link setup** menu		

*Table 11: **PC link setup** menu screens*

10.6.Adjusting Date/time: "Adjust Date/time" menu

The ***"Adjust Date/Time"*** menu is used to set date and time. Data format can be changed to conform to the format used in the country where the CPP 5Gs is used.

Upon activation of the ***"Adjust Date/Time"*** menu, the following screen is displayed:

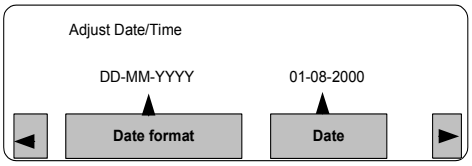
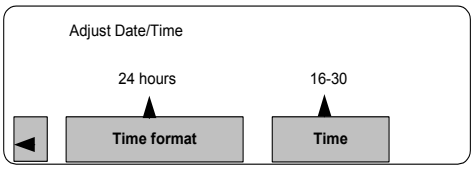
Screens (**Adjust Date/Time** menu)	**Purpose of menu** (From left to right and from top to bottom respectively).	**Field entry**
	Adjust date and time. **Date Format**: **Date**: as per selected format.	 DD-MM-YY MM-DD-YY YY-MM-DD YY-DD-MM DD-MM-YYYY MM-DD-YYYY YYYY-MM-DD YYYY-DD-MM
Screen 1 of **Adjust Date/time** menu.		
		Next screen
	**Time format**: **Time**: as per selected format .	(12/24)h
Screen 2 of **Adjust Date/time** menu.		

*Table 12: **Adjust Date/Time** menu screens.*

10.7."Service setup" menu

The **Service setup** menu's function is analyzer maintenance. It includes sub-menus for entering regulation coefficients and changing calibration values. It also features commands for downloading software and transferring files to a PC.
Activating the **"Service setup"** menu provides access to the following screen:

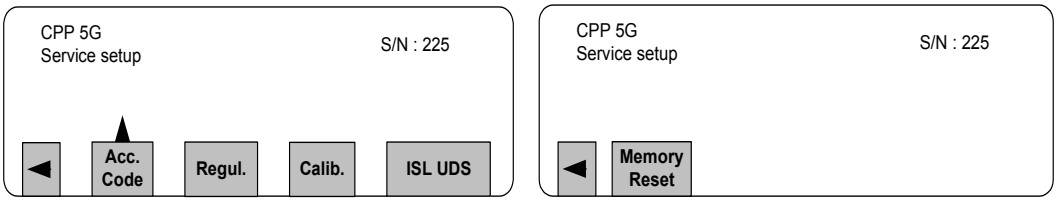


*Figure 35: **"Service setup"** menu screen.*

The sub-menus serve the following purposes:

- **Access code**: Access to level 2 (service).
- **Regul.**:Entry of regulation coefficients.
- **Calib**:.Entry of calibration values for sample and jacket temperature probes.
- **ISL UDS:** Command for downloading control software, text software and internal parameters.
- **Memory Reset:** saved memory results deletion

10.7.1.Entering regulation parameters: "Regulation parameters" menu

Regulation parameters can be entered directly through the following screen (refer to list of parameters supplied with the instrument):

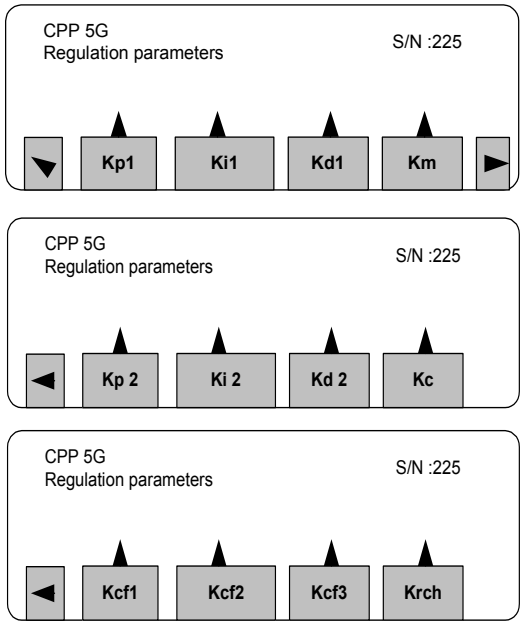


Figure 36: "Regulation parameters" menu screens

These parameters are factory set and they normally must not be modified.

Reheating at the end of test
Nevertheless Krch and Kcf2 parameters can be adjusted if necessary: at the end of test, before jacket returns to the ambient temperature (refer to the paragraph 6.3 - Cooling profile: "Cooling profile" menu page 2-48), jacket is heated to the Krch temperature (45°C) during the Kcf2 duration to dry up the refrigerating compressor finger and avoid water vapor accumulation in the tilting system. When the Kcf2 duration is passed, jacket is maintained to the final temperature predicted in the cooling profile of the test which has just completed.

Kcf2: default value: 30 min
If Kcf2=999, compressor is not stopped, jacket is permanently heated at Krch temperature.

Krch: its value is taken between 25 and 45°C (its default value is 45°C).

10.7.2.Entering calibration values: "Modify calibration values" menu

In the event of a data loss, calibration values can be entered directly using the following screen, with no prior adjustment:

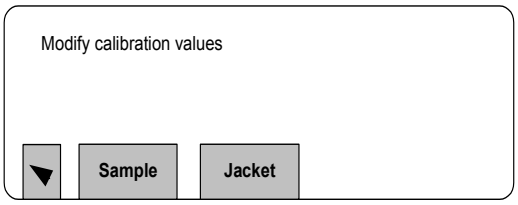


*Figure 37: **."Modify calibration values"** menu*

10.7.3.Changing sample temperature calibration values

"High" and "low" reference values of resistance relate to sample temperature calibration. They are computed by an automatic process and should require no further change.
If these values are altered manually, this will be indicated through an asterisk on screen displays and printouts of results.

10.7.4.File uploading/downloading: "Upload/Download" menu

The basic analyzer is delivered with a PC program for downloading internal parameters from a PC to the analyzer and receiving internal parameters from the non-volatile saving memory. The "service" port is used for downloading. Analyzer program code and text software can also be updated using an update diskette.
An external connecting cable is supplied as a standard accessory for PC-analyzer communications. .
There is no provision for modem signal management when downloading. To download via a modem, proceed in two stages:
1.Remote download from PC to PC via modem.
2.Local download from PC to analyzer (without modem).
Uploading/Downloading is a specific analyzer mode. The analyzer switches to the Uploading/Downloading mode:
•Either upon automatic detection of a downloading requirement,
•Or upon a specific request entered through the analyzer keyboard.
In the first case, the analyzer entering the mode cannot leave it until a link with the computer has been established.
In the second case, it is preferable not to try leaving the downloading mode. Downloading causes a « clear storage ». If an error has occurred, it is preferable to allow the downloading to continue, and to repeat it later. If the operator stops the analyzer while downloading, the instrument will automatically detect that a data transfer is required next time it is switched on.

10.7.4.1.File transfer principle

The analyzer switches to the downloading mode either automatically or on user's request. It awaits transmission from the PC.
When the downloading software is activated at the PC, it sends the analyzer a specific message.
The analyzer responds by stating the downloading type required, followed by a safety sequence. The PC then downloads the data to the analyzer.
When the PC software determines that the downloading has been completed, the PC sends a validation signal to the analyzer.

10.7.4.2.Download program installation and startup

Follow "Read me" file instructions.

10.7.4.3.Transfer request by operator

Preparation

- Switch off PC and analyzer, and use cable to connect analyzer service port to PC series port.
- Switch on PC and analyzer

On the analyzer:

- Select software downloading menu.
- Select desired function ("Uploading" will be to the PC). The transfer type expected will be displayed on the analyzer screen.

On the PC

- Initiate the transfer from the PC as explained in the « Read me » file.
- Enter the number (1 or 2) of the series communication port (COM) used.

Download analyzer program code and text software.

- Enter the name and the extension of the information file ISL.CPP.Vxx (xx being the software version code), the press ENT to validate (type in file name and extension).

Downloading internal parameters

- Enter name of requested file and press ENT to validate.

When uploading internal parameters to a PC, use new filename on each uploading (e.g., day's date within the name - PIDDMMYY.NVM).

The operator is informed of the ongoing transaction through the PC display.

On the analyzer:

The operator is informed of the nature of the ongoing transaction through the analyzer display.

End of transfer:

If the transfer has been successfully completed:

- The analyzer is automatically re-initialized.

10.7.4.4.Failed transfer, or screen remains dark

If the data transfer fails, the analyzer must automatically detect a downloading requirement. Also, if the analyzer screen fails to light up when it is switched on, the analyzer might detect a downloading requirement.
•Switch off the PC and the analyzer.
•Switch the PC and the analyzer on again.
•Start downloading program as explained above (section 10.7.4.3 page 2-70). If downloading is required, the requirement will be detected automatically by the analyzer.
While the analyzer is awaiting downloading, the red LED flashes (at the rate of one flash per second).
Downloading in progress is indicated by flashing at a frequency proportional to the transfer rate.
Upload/download commands can be accessed through the following screens:

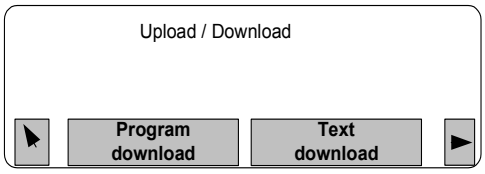
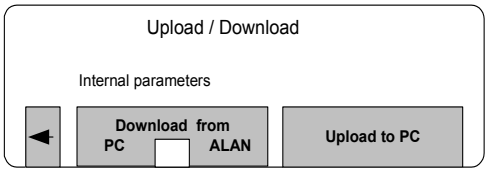
Screens (**Upload/Download** menu).	**Purpose of menu** (From left to right and from top to bottom respectively).
 Screen 1 of **Upload/Download** menu	Upload/Download **Program download**: to download control software. **Text download:** :to download control software text fields.
Next screen	
 Screen 2 of **Upload/Download** menu.	Internal parameters: **Download from PC/ALAN®** : to download via ALAN® network. **Upload to PC**: data transfer to PC.

*Table 13: **Upload/Download** menu screens*

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Appendix A Examples of printout types

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1 - 80-column result printout

```
30/09/2005 11:31      ISL  CPP 5Gs      Software V 2.1/ 2.1   S/N:  223
 ALAN ID:ISL CPP 5Gs
 Cooling unit S/N:M100B3#323/7

  Sample ID:12181        No:             Exp. pt. : -24.0°C
  Program  :  7 D97                      Operator : AM
  Pour: -27.0°C
  Date: 30/09/2005   Time: 11:01


 Program No:  7 Name: D97
  Type of analysis: Pour
  First test at EP+   9°C               Test frequency:   3.0
  Stop 3 tests after EP: NO             Detection level: 350
  Alarm at -150.0°C                     Stop at -150.0°C

 Cooling profile No:  7 Name:D97

  Step :
   1 Sample preheating at  45.0°C for   0 min
   2 If EP >  -33.0°C then step  3  else step  4
   3 Jacket level at   24.0°C until sample <   27.0°C
   4 Jacket level at    6.0°C until sample <   15.0°C
   5 Jacket level at    0.0°C until sample <    9.0°C
   6 Jacket level at  -18.0°C until sample <   -6.0°C
   7 Jacket level at  -33.0°C until sample <  -24.0°C
   8 Jacket level at  -51.0°C until sample <  -42.0°C
   9 Jacket level at  -69.0°C until sample <  -60.0°C
  10 Jacket level at  -87.0°C until sample <  -78.0°C
  11 Jacket level at -105.0°C until sample <  -96.0°C
  12 Jacket level at -123.0°C until sample < -114.0°C
  13 Final heating, jacket temperature  25.0°C
```

2 - 80-column internal parameter printout

```
30/09/2005 11:31      ISL  CPP 5Gs      Software V 2.1/ 2.1   S/N:  223
 ALAN ID:ISL CPP 5Gs

 Internal parameters

 Sample Temp. measurement calibration     Next calibration date: 05/05/2006
  Calibration frequency: 365 days         Start test refusal: NO
  -50°C/ -58°F:  80.267 ohms A/D: 88E7B8  +50°C/+122°F: 119.412 ohms A/D: CBA909

 Sample probe corr table (Cloud):
  -150°C:  0.0        -140°C:  0.0        -130°C:  0.0        -120°C:  0.0
  -110°C:  0.0        -100°C:  0.0         -90°C:  0.0         -80°C:  0.0
   -70°C:  0.0         -60°C:  0.0         -50°C:  0.0         -40°C:  0.0
   -30°C:  0.0         -20°C:  0.0         -10°C:  0.0           0°C:  0.0
    10°C:  0.0          20°C:  0.0          30°C:  0.0          40°C:  0.0
    50°C:  0.0          60°C:  0.0

 Sample probe corr table (Pour):
  -150°C:  0.0        -140°C:  0.0        -130°C:  0.0        -120°C:  0.0
  -110°C:  0.0        -100°C:  0.0         -90°C:  0.0         -80°C:  0.0
   -70°C:  0.0         -60°C:  0.0         -50°C:  0.0         -40°C:  0.0
   -30°C:  0.0         -20°C:  0.0         -10°C:  0.0           0°C:  0.0
    10°C:  0.0          20°C:  0.0          30°C:  0.0          40°C:  0.0
    50°C:  0.0          60°C:  0.0

 Jacket Temp. measurement calibration
  Set point: 10.00°C correction: 0.00°C   Set point:-34.00°C correction: 0.00°C

 Power on parameters                      Access level:0    Auto edition:2
  Cloud program:   1 D2500                Pour program:   9 ISO3016

 Printer setup                            Automatic results printing: YES
  Results printing with                   Program    :YES
  Paper width: 80     Red code  :  18     Degree code: 91    Line feeds :  2

 RS232 setup
  Time between two messages               if no flow control used : 0.1 s
  On line  :    NO  Analyzer ID :   1     Automatic result validation   : NO
  Transmitted data with the result        Conditions of run: NO  Program: NO
  Rate     :  9600  Data bits   :   8     Stop bits:     1  Parity      : NO
  End of transmission character :   0     Flow control :   NO

 PC link setup        ID:ISL CPP 5Gs      On line: YES  Address: 6

 Date/time setup                          Date:DD-MM-YYYY  Time:24 hours

 Laboratory setup                         Laboratory name:
  Laboratory Manager name:                Title:
 Alarms setup                             Buzzer modulation: 30 % Time: 10 sec
  Sample T:    t-:-150°C t+:  55°C  30 s  Jacket T:    t-:-150°C t+:  55°C  30 s
 Regulation parameters
  Kp1: 15.0 Ki1: 0.10 Kd1: 40.0 Km:10.0   Kp2:  6.0 Ki2: 0.10 Kd2:  0.0
  Kcf1:  0  Kcf2: 30  Kcf3: 30  Krch: 45

 ISL  400/DFFF   -1/FFFF   2.1/94A0        2.1/60D6   0/ 2  19/01/2005    73
 Cooling unit parameters
 S/N :M100B3#323/7  27/11/2001          Runs:   685        31/01/2002
    3225:15       896:46         95:19       201:10       196:54         22:58
       0:00         0:00          0:00


25/03/2003  18   223       100 %       15/10/2003                100 %
   17    2min26   181                     17    2min30   185
    0    3min50   210                     0    3min55   207
   -9    4min34   211                     -9    4min40   208
  -17    5min16   211                     -17    5min24   212
  -34    7min03   213                     -34    7min14   216
  -51    9min22   219                     -51    9min35   221
  -68   12min29   224                     -68   12min44   224
  -87   18min06   230                     -87   18min20   232
 -100   27min41   234                     -100   26min15   236
 -110         0     0                     -110         0     0
T.out:60min00                          T.out:60min00
```

3 - 80-column calibration ticket printout

```
30/09/2005 11:31      ISL  CPP 5Gs      Software V 2.1/ 2.1   S/N:  223
 ALAN ID:ISL CPP 5Gs
 Cooling unit S/N:M100B3#323/7

 Calibration ticket

 Sample Temp. measurement calibration
  Operator: LC                          Calibration reference: MP0503
  Calibration performed: 05/05/2005     Next calibration     : 05/05/2006
  -50°C/ -58°F:  80.267 ohms A/D: 88E7B8  +50°C/+122°F: 119.412 ohms A/D: CBA909
  Sample probe corr table:

 Jacket Temp. measurement calibration
  Operator:                             Calibration reference:
  Set point: 10.00°C correction: 0.00°C   Set point:-34.00°C correction: 0.00°C

 Laboratory name:
 Laboratory Manager name:               Title:

 Comments:
 Date:             Signature:
```

4 - 80-column measurement printout

```
30/09/2005 11:31      ISL  CPP 5Gs      Software V 2.1/ 2.1   S/N:  223
 ALAN ID:ISL CPP 5Gs
 Cooling unit S/N:M100B3#323/7

 Measures
  Sample temperature:   -3.5°C           R: 98.64ohms   A/D:A83D
  Jacket temperature:   24.9°C           R:109.71ohms   A/D:BB3E
  Cooling  :   0.0%   0 Flags: 00000011   Heating  :   4.6%  11
  Emitter  :    0 pts Receiv.:    28 pts  Motor    :    0 pts
```

5 - Printing test

```
30/09/2005 11:31      ISL  CPP 5Gs      Software V 2.1/ 2.1   S/N:  223
 ALAN ID:ISL CPP 5Gs
 Cooling unit S/N:M100B3#323/7

 Printer checking
  !"#$%&'()*+,-./@ABCDEFGHIJKLMNOPQRSTUVWXYZ^?`abcdefghijklmopqrstuvwxyz aeee °
```

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Appendix B RS232 link features on CPP 5Gs

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In this document, ***analyzer*** is used for the ISL CPP 5Gs while ***host computer*** designates the computer to which the ISL CPP 5Gs is connected.

1 - Interface features

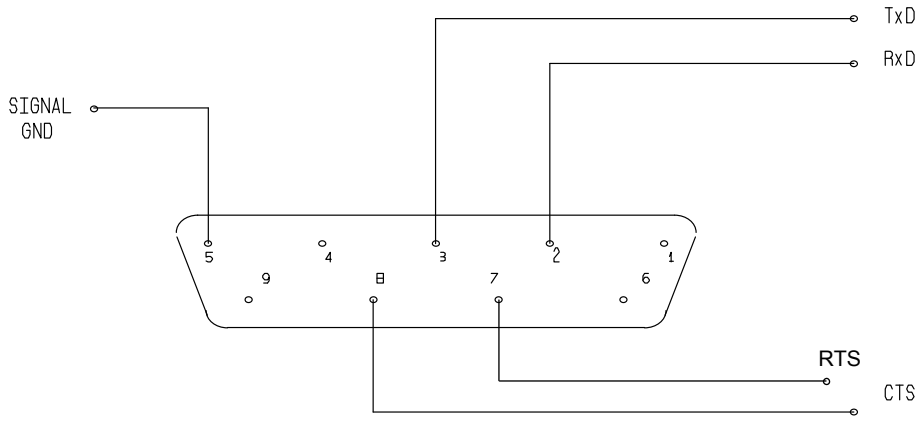
EIA-RS 232C serial link

Rate : 300 to 19200 bps
Data bits : 7, 8
Stop bits : 1, 2
Parity : none, odd, even

Switchable on-line / off-line state
Pre-defined message transmission available for test
Possibility to define an identifier (number) for the analyzer
Possibility to activate result auto-validation.
Automatic detection of the RS232 interface cable adapter

2 - Outlet connector broaching

The RS 235 connector of the adapter is a 9-pin connector. The pin configuration is as shown below.



EIA RS 232C interface

Line status in standby: +12 V (MARK),
Input signals used: CTS/RTS.

3 - Communication protocols

Flow control / Protocol can be :

- None
- RTS/CTS
- Xon/Xoff
- ENQ/ACK

Flow control	Type	Comments	
None		Transmitted messages are sent **without any way to stop them** from the host computer. However, a special parameter ("Time between two messages") in the ISL analyzers allows to define a pause between to successive message from 0.0 s to 10.0 s (by step of 0.1 s) *Note : This time is applied between 2 entire messages (not between characters)*	
RTS / CTS	Hardware	Existing signals defined in the RS232 interface standard are used to control the transmission. Connect the host computer serial RTS signal to the analyzer CTS signal. When the input buffer of the host computer is full, the RTS signal changes its state. Seeing its CTS signal changing, the analyzer stops transmission until CTS changes again. *Note: This **hardware handshake is controlled by the communication hardware devices** and can stop / restart transmission between any characters*	
Xon / Xoff	Software	This well-known handshake is qualified as "software protocol" because it is **controlled by the host computer reception software to control the data flow**. If the software needs time to process the last incoming message, it can send the Xoff character to the analyzer which immediately stops the transmission, until it receives from the host computer the Xon character.	Xon = 11H Xoff = 13H
ENQ / ACK	Software	This is a full protocol. It allows **flow control and data acknowledgment**. The transmission is fully controlled by the host computer which must send a ENQ (enquiry) character. Any message must be acknowledged by the host computer by sending a ACK character. *Note : There is no need to define a time between messages because the message sequencing keeps pace with the ENQs sent by the host computer.*	Developed by ISL this protocol is detailed below.

4 - ENQ/ACK protocol details

All messages from the analyzer must be acknowledged by the host computer.
Should communication fail, only the host computer can decide whether or not to abort transmission.

Analyzer response time on receiving ENQ:	< 100 ms
Waiting time for message acknowledgment:	2 sec
Results transfer delay after end of test (delay for ENQ) :	not limited
Number of transmission of the same result message on receiving NAK:	not limited (end with ACK or EOT reception)

Request, reception and acknowledgement of results

The host computer uses the ENQ code (05H) to ask the analyzer if any results are ready to be sent.
If the analyzer has no results to send, it replies ACK (06H). the host computer does not have to reply to this ACK.

	ANALYZER		HOST COMPUTER
No result available		←	**ENQ**
No result	**ACK**	→	

If the analyzer has results, it starts their transmission.
On receiving the message, the host computer must check it (checksum) and must reply ACK (06H) or NAK (15H), depending on whether the message was correct or not.
If there are several fruitless communications, the host computer may decide to abort transmission by sending an EOT (04H) character.

	ANALYZER		HOST COMPUTER
Successfull transmissions		←	**ENQ**
1 result message	**XXXXX**	→	
		←	**ACK**
		←	**ENQ**
Next result	**YYYYY**	→	
		←	**ACK**
		←	**ENQ**
No more result	**ACK**	→	

	ANALYZER		HOST COMPUTER
Result sent, faulty reception		←	**ENQ**
1 result message	**XXXXX**	→	(not properly received)
		←	**NAK**
		←	**ENQ**
Same message	**XXXXXX**	→	(not properly received)
		←	**NAK**
		←	**ENQ**
Same message	**XXXXXX**	→	(not properly received)
Host ends the communication		←	**EOT** Abort

5 - Transmitted data

Example:

```
( 1,"R ","LV593-100-20","001          ", 1, 0,9999.9, -42.0, 1," ")61
( 1,"C ","LC","10/07/2000", 4,"15:43 ")23
( 1,"T1","D2500", 0, 0,99.9,99.9,99,-150.0,-150.0,100,999, 0)3C
( 1,"T2", 1,"D2500       ", 0)EC
( 1,"T2", 1, 3,  45.0,   0.0)E1
( 1,"T2", 2, 4,   6.0,  27.0)E9
( 1,"T2", 3, 4,   0.0,   9.0)D4
( 1,"T2", 4, 4, -18.0,  -6.0)05
( 1,"T2", 5, 4, -33.0, -24.0)13
( 1,"T2", 6, 4, -51.0, -42.0)14
( 1,"T2", 7, 4, -69.0, -57.0)24
( 1,"T2", 8, 4, -84.0, -75.0)22
( 1,"T2", 9, 4,-102.0, -93.0)2A
( 1,"T2",10, 4,-120.0,-108.0)3F
( 1,"T2",11, 4,-135.0,-126.0)46
( 1,"T2",12,13,  25.0,   0.0)02
( 1,"T2",13, 1,   0.0,   0.0)D9
```

The data which can be transmitted are divided in 4 groups:

Group	Contents	Transmitted...
Results	See messages R below	Always
Run context	See message C below	If defined in the RS232 Link setup
Run program used	See message T_1 below	If defined in the RS232 Link setup
Cooling profile used	See message T_2 below	If defined in the RS232 Link setup

To be transmitted, a result must be validated.

- manual validation must be performed at the analyzer level. The transmission is possible after the validation.
- automatic validation can be set in the RS232 Link setup. The transmission is possible as soon as the test is ended.

5.1 - Message format

Messages are in ASCII code.
Character strings are enclosed within **“ “** (double quotes).
They start with an opening bracket **(**
They finish witha closing bracket **)** , 2 characters **CK** , and the characters : **CR, LF** and **EOT**

- CK (2 characters) = checksum = the 2 least significant digits (expressed in ASCII) of the result of the hexadecimal sum of all the preceding characters, including the brackets.
- CR (1 non printable character) = Carriage Return = 0Dh
- LF (1 non printable character) = Line Feed = 0Ah
- EOT (1 non printable character) = End Of Transmission character, programmable in the RS232 configuration menu. (If = 0 , there is no end of transmission character)

The value 999 indicates that the field is not being used (reserved for a future use).

5.2 - Result message

The CPP result is sent in the R message.
Example: `( 1,"R ","LV593-100-20","001 ", 1, 0,9999.9, -42.0, 1," ")61`

Meaning of result message fields from left to right

R message

Field designation	Format	Number of characters	Field entry	Example
Analyzer No.	00 to 99	2		1
Message type	Chained list	2	"R" =result	R
Sample ID	Chained list	12		ISL 3419
Sample number	Chained list	12		E8-N-05
Program test number	00 to 99	2		1
Temperature unit	00 to 01	2	0=°C, 1=°F	0
Estimated temperature	-999.9 à 9999.9	6		-15.0
CPP results	-999.9 a 9999.9	6		-32.0
Test type	00 to 01	2	0=Cloud 1=Pour	0
Calibration required	Chained list	1	‘ ‘= OK, ‘*’= rqd.	<>
Type of the end of test	00 to 06	1	1 : « Cloud : _ _ » : normal cloud end of test 2 : « Pour _ _ » : normal pour end of test 3 : « Test stop at : _ _ » : end of test on stop temperature (cloud or pour) 4 : « Test stop: End cooling prof. » : end of test by end of cooling profile reached (cloud or pour) 5 : « Pour not found at : _ _ » : end of test by number of test reached after EP (pour) 6 : « Pour : _ _ at 1st tilt » : end of test by detection of the first tilting (pour)	1

5.3 - Context message

The context of the run is sent in one single message C.
Example: `( 1,"C ","LC","10/07/2000", 4,"15:43 ")23`

C message

Field designation	Format	Number of characters	Field entry	Example
Analyzer No.	00 to 99	2		1
Message type	chained list	2	C = condition	C
Operator's name	chained list	12		LG
Date	chained list	10		28/04/1999
Date format	00 to 07	2	0 : DD-MM-YY 1 : MM-DD-YY 2 : YY-MM-DD 3 : YY-DD-MM 4 : DD-MM-YYYY 5 : MM-DD-YYYY 6 : YYYY-MM-DD 7 : YYYY-DD-MM	4
Time	chained list	6		12:29
Checksum		2	Sum of all characters	46

5.4 - Program message

The "program" information is sent in one single message T_1.
Example: `( 1,"T1","D2500", 0, 0,99.9,99.9,99,-150.0,-150.0,100,999, 0)3C`

T_1 message

Field designation	Format	Number of characters	Field entry	Example
Analyzer No.	00 to 99	2 characters		1
Message type	chained list	2 characters	"T1"= test program	T1
Program name	chained list	12 characters		CFPP (°C)
Temperature unit	00 or 01	2 characters	0=°C, 1=°F	0
Test type	00 to 01	2 characters	0=Cloud 1=Pour	.0
Test frequency	99.9	4 characters		3.0
Start testing at ET+	99	2 characters		12
Stop 3 tests after ET	00 or 01	2 characters	0= no 1= yes	1
Alarm temperature	999.9 to 9999.9	6 characters		-25.0
Stop temperature	99.9 to 9999.9	6 characters		-70.0
Cloud threshold	999	3 characters		100
Pour threshold	999	3 characters		350
Rounded temperature	00 or 01	2 characters	0=no, 1= yes	0
Checksum		2 characters	Sum of all characters	13

5.5 - Cooling profile message

The cooling profiles are sent in several messages T2. Each messages corresponds to one step.
Example:
```
( 1,"T2", 1,"D2500       ", 0)EC
( 1,"T2", 1, 3,  45.0,   0.0)E1
( 1,"T2", 2, 4,   6.0,  27.0)E9
( 1,"T2", 3, 4,   0.0,   9.0)D4
( 1,"T2", 4, 4, -18.0,  -6.0)05
( 1,"T2", 5, 4, -33.0, -24.0)13
( 1,"T2", 6, 4, -51.0, -42.0)14
```

T_2 message

Field designation	Format	Number of characters	Field entry	Example					
Header (1 message)									
Analyzer No.	00 to 99	2 characters		1					
Message type	chained list	2 characters	T2 : cooling profile	T2					
Cooling profile No.	01 to 05	2 characters		1					
Cooling profile name	chained list	12 characters							
Temperature unit	00 to 01	2 characters	0=°C, 1=°F	0					
Cooling profile stages (1 message per stage)									
Analyzer No.	00 to 99	2 characters		1					
Message type	Chained list	2 characters	T2 : cooling profile	T2					
Stage number	00 to 20	2 characters		1	2	3	4	5	6
Stage type	00 to 13	2 characters		3	4	4	4	13	1
Set point	-999.9 to 9999.9	6 characters		45.0	-33.5	-50.5	-66.5	25.0	0.0

6 - RS232C link test

(ISL CPP 5Gs)D8

Appendix C Diagrams

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1 - Test launch diagram

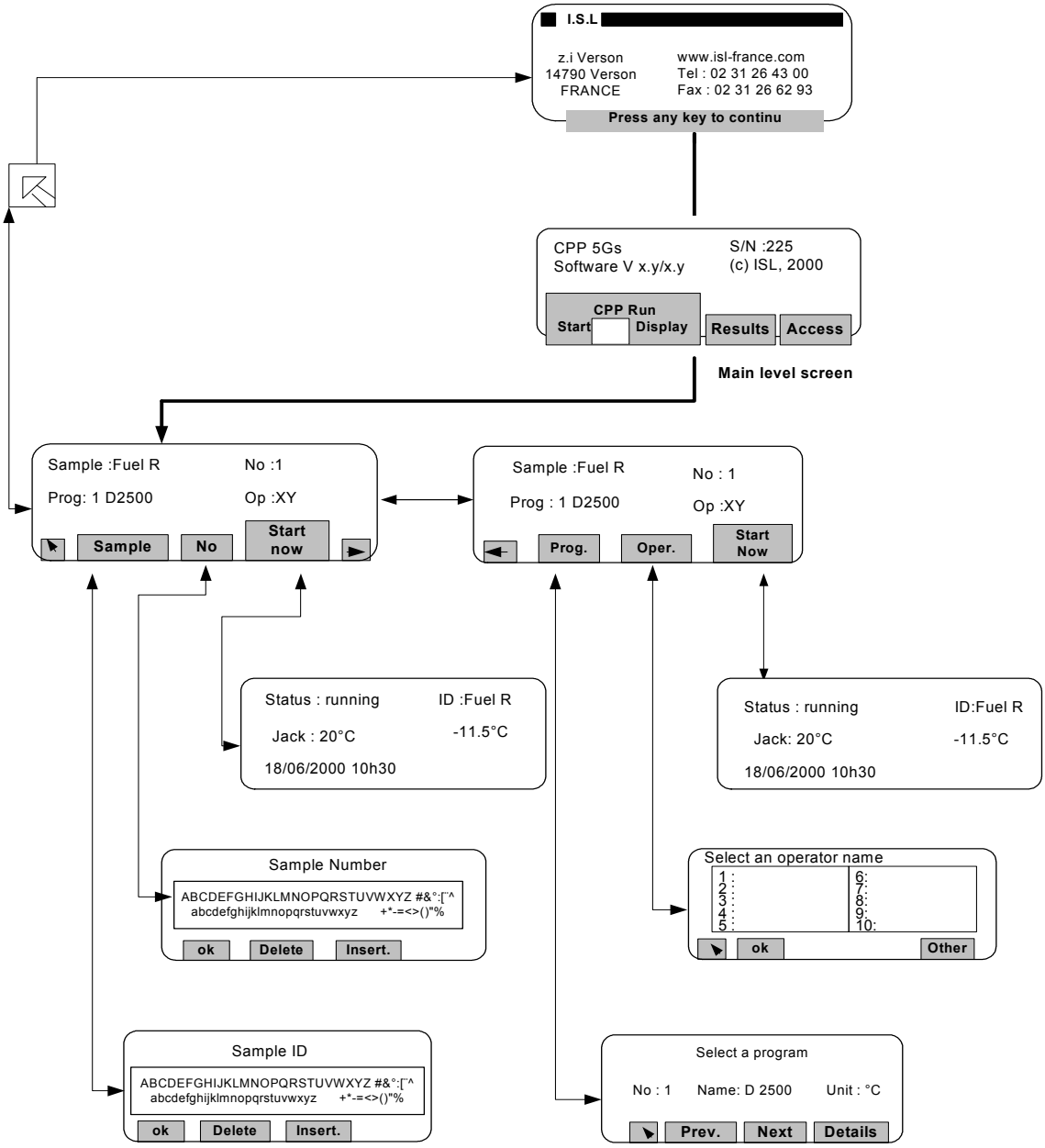
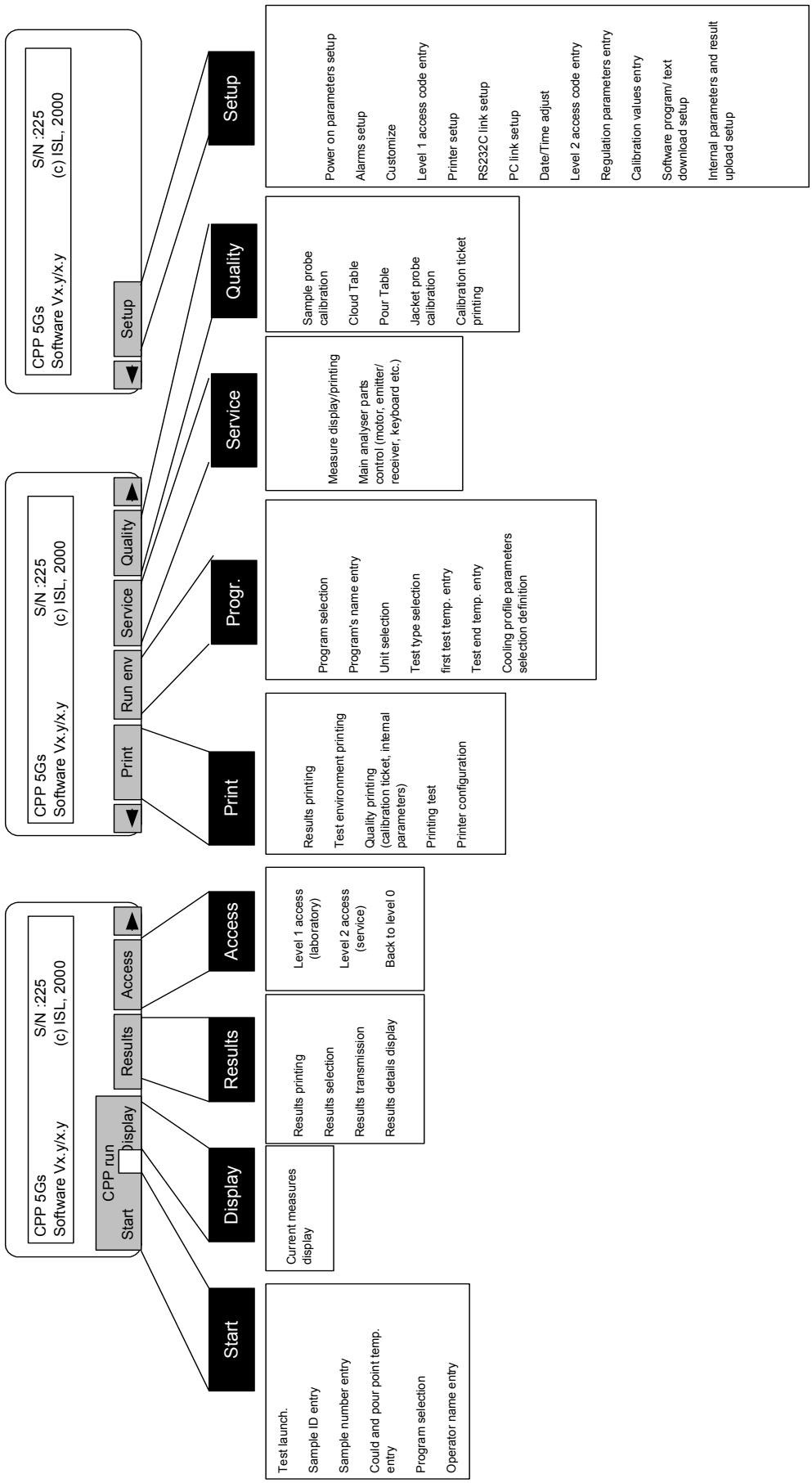


Chart 5: Test initiation chart.

2 - Action chart



Appendix D Maintenance of measuring heads

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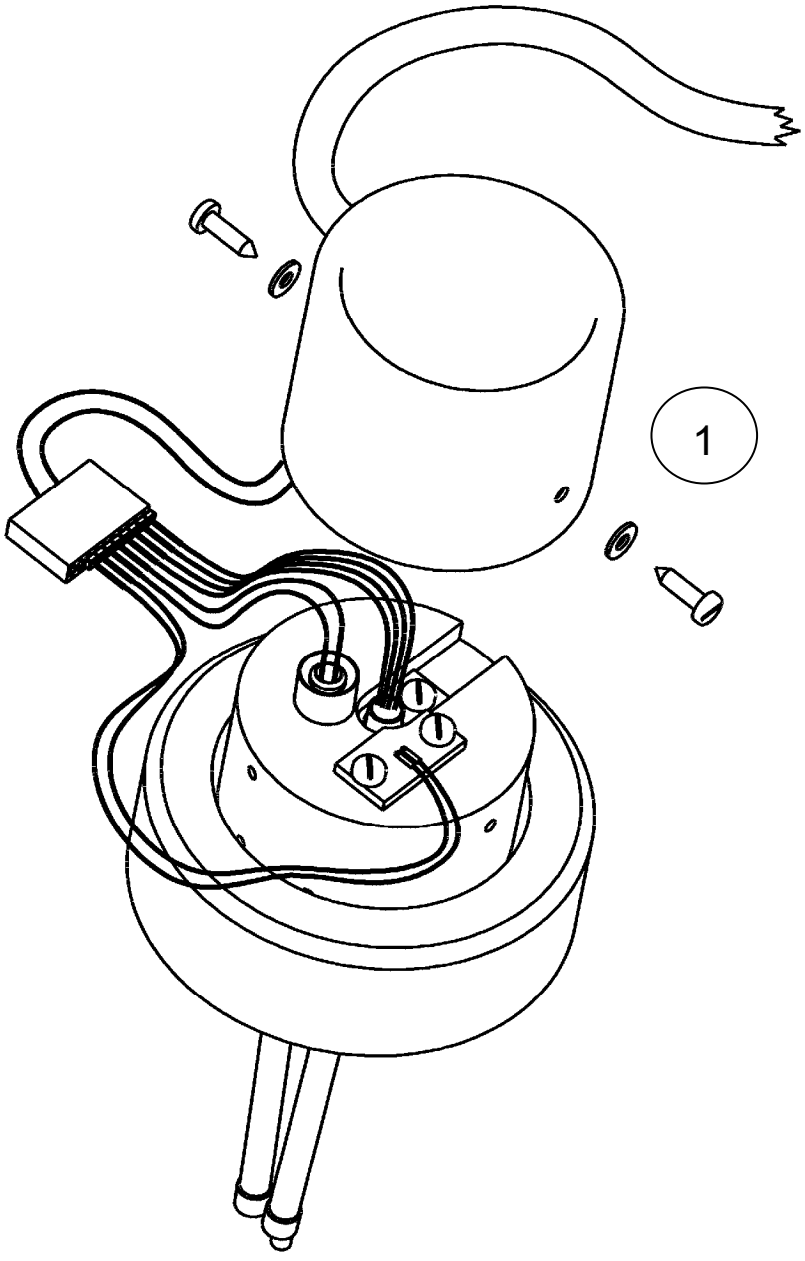
1 - Maintenance of the cloud point measuring head

1.1 - Taking apart of the cover



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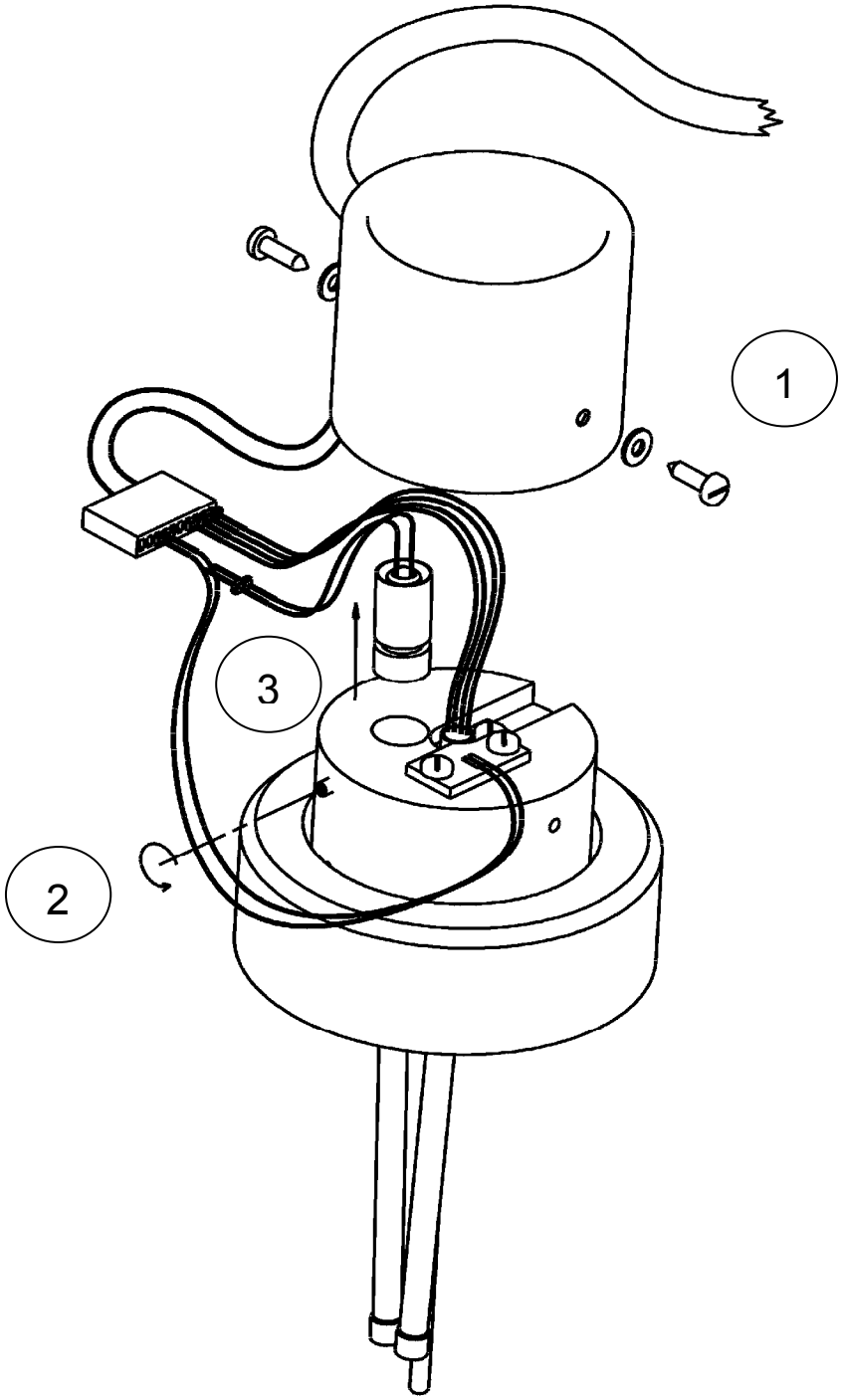
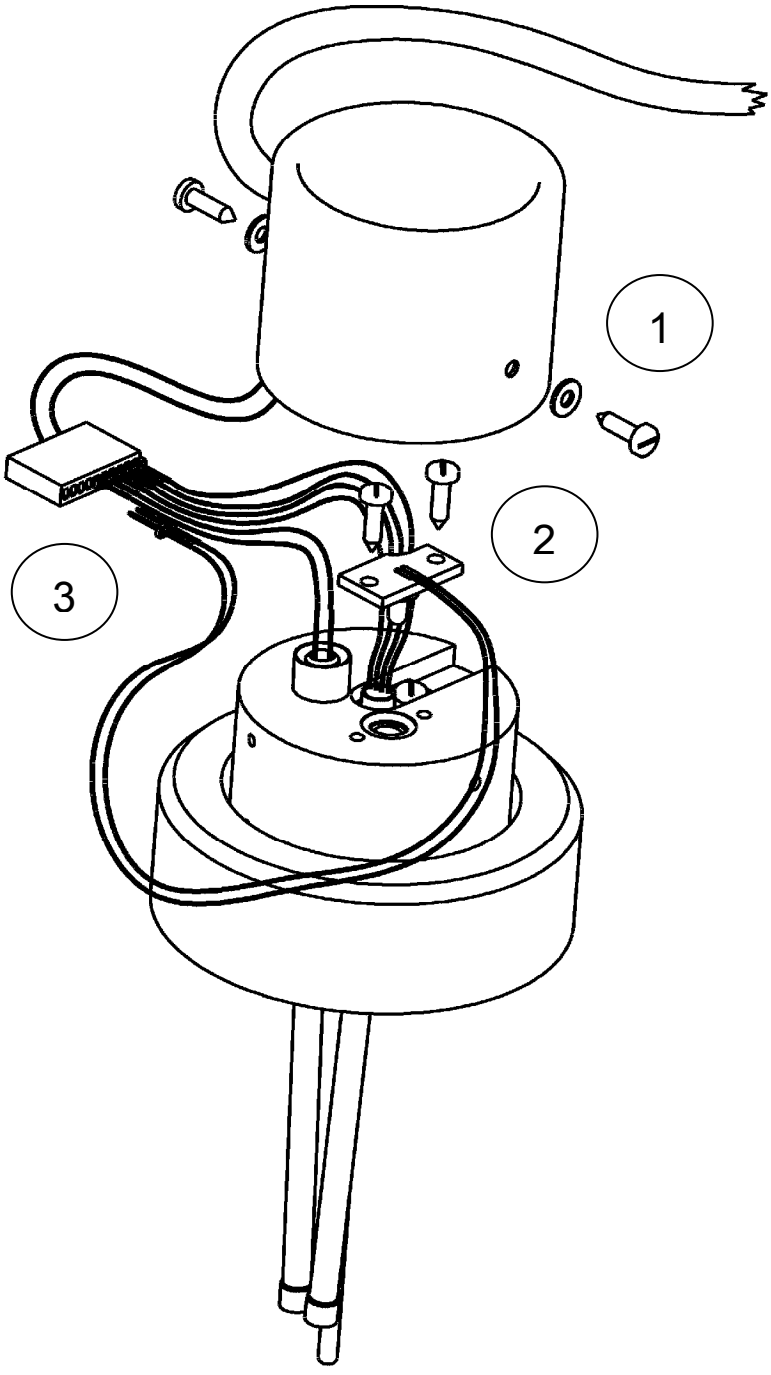
1.2 - Taking apart of the receiver



1.3 - Taking apart of the emitter



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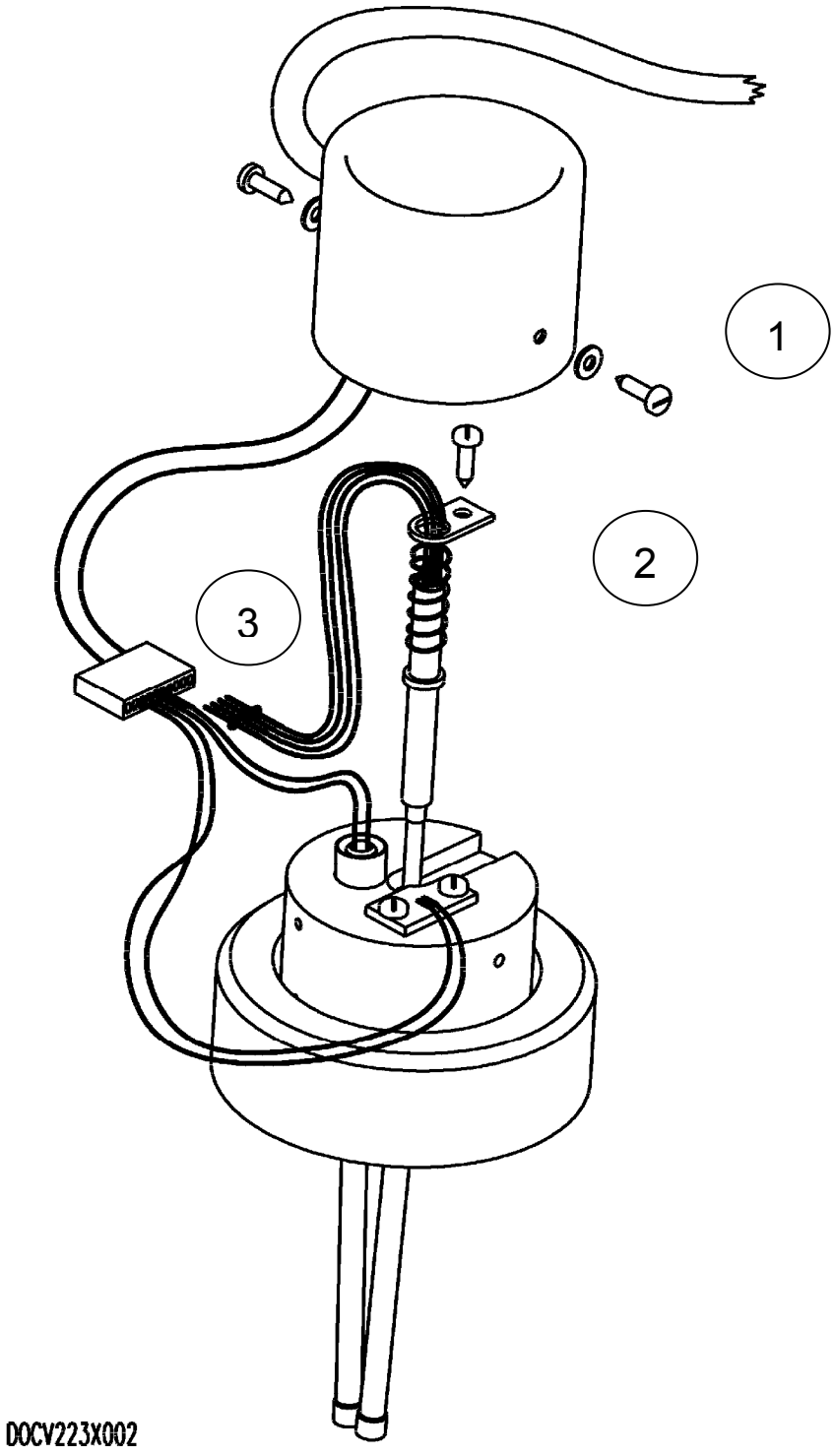
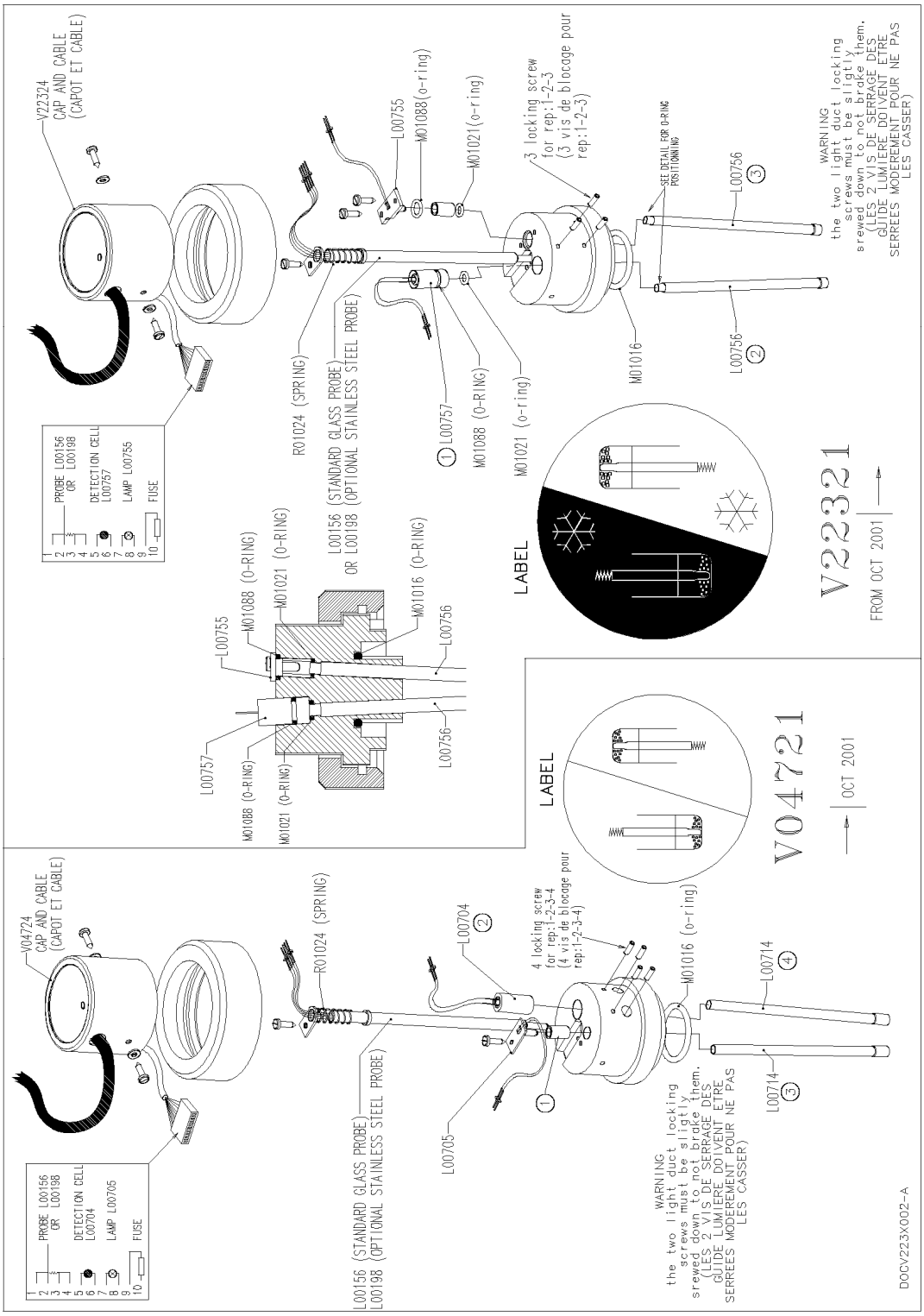
1.4 - Taking apart of the temperature probe



1.5 - New cloud point detection head compatibility

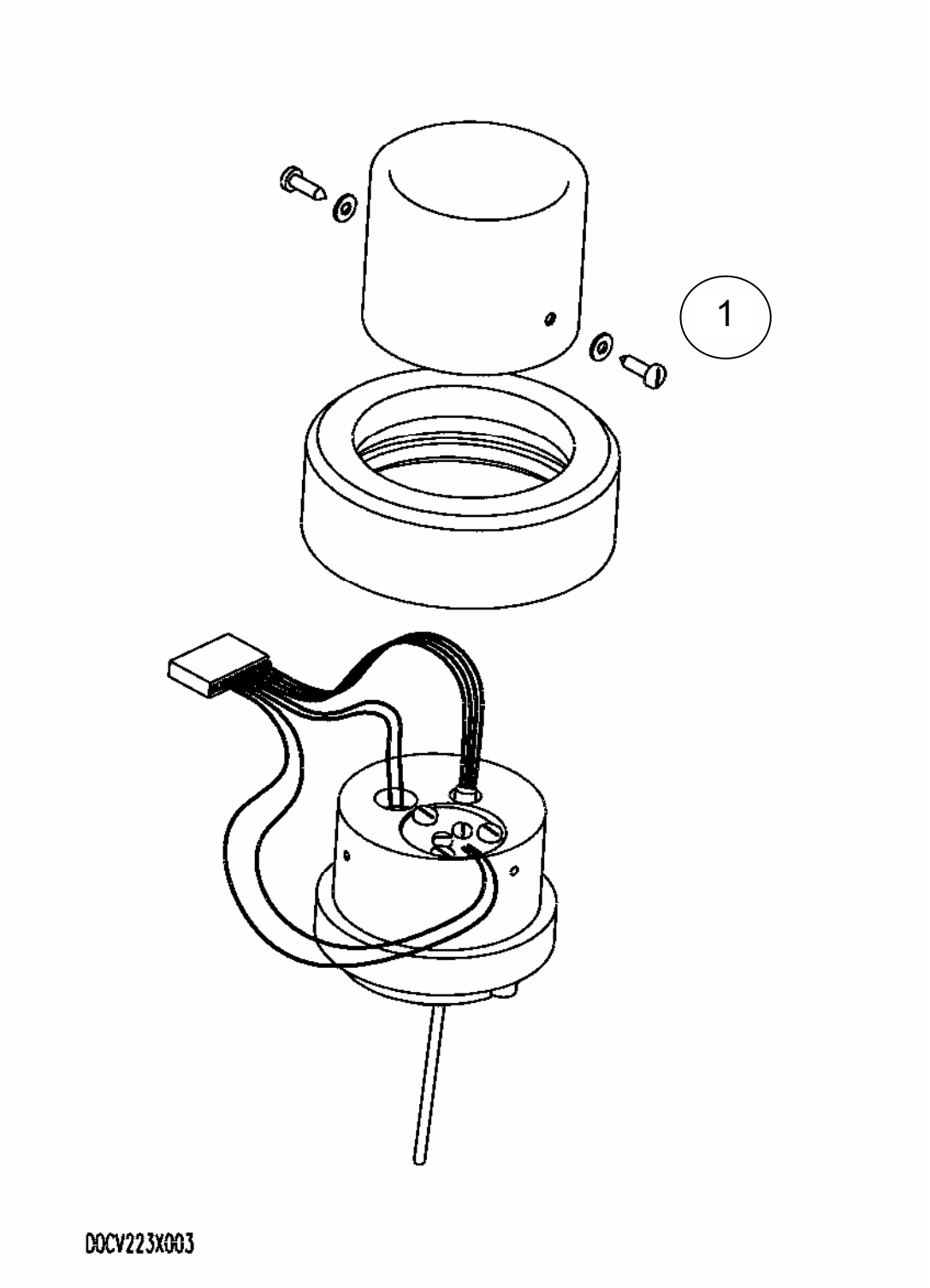


Sample probes	*Part N*	*Description*	*Application range*
Standard	L00156	Sample temp. Probe / CP/ Glass	- 95 to +50°C (-139 to 122 °F)
Optional	L00198	Cloud point metal probe / -90..+50C	- 90 to +50°C (-130 to 122 °F)

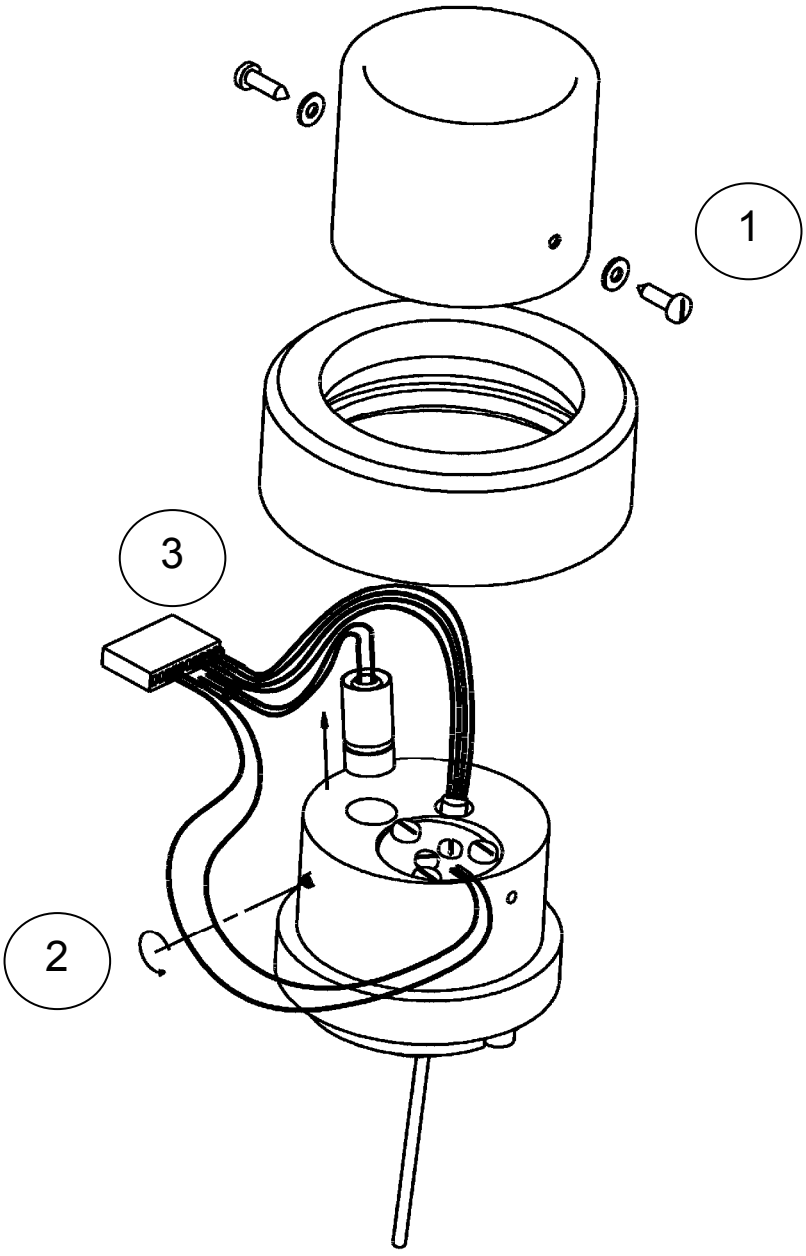
Compatible with ISL CPP97-6, CPP97-2 and CPP5Gs

2 - Maintenance of the pour point measuring head

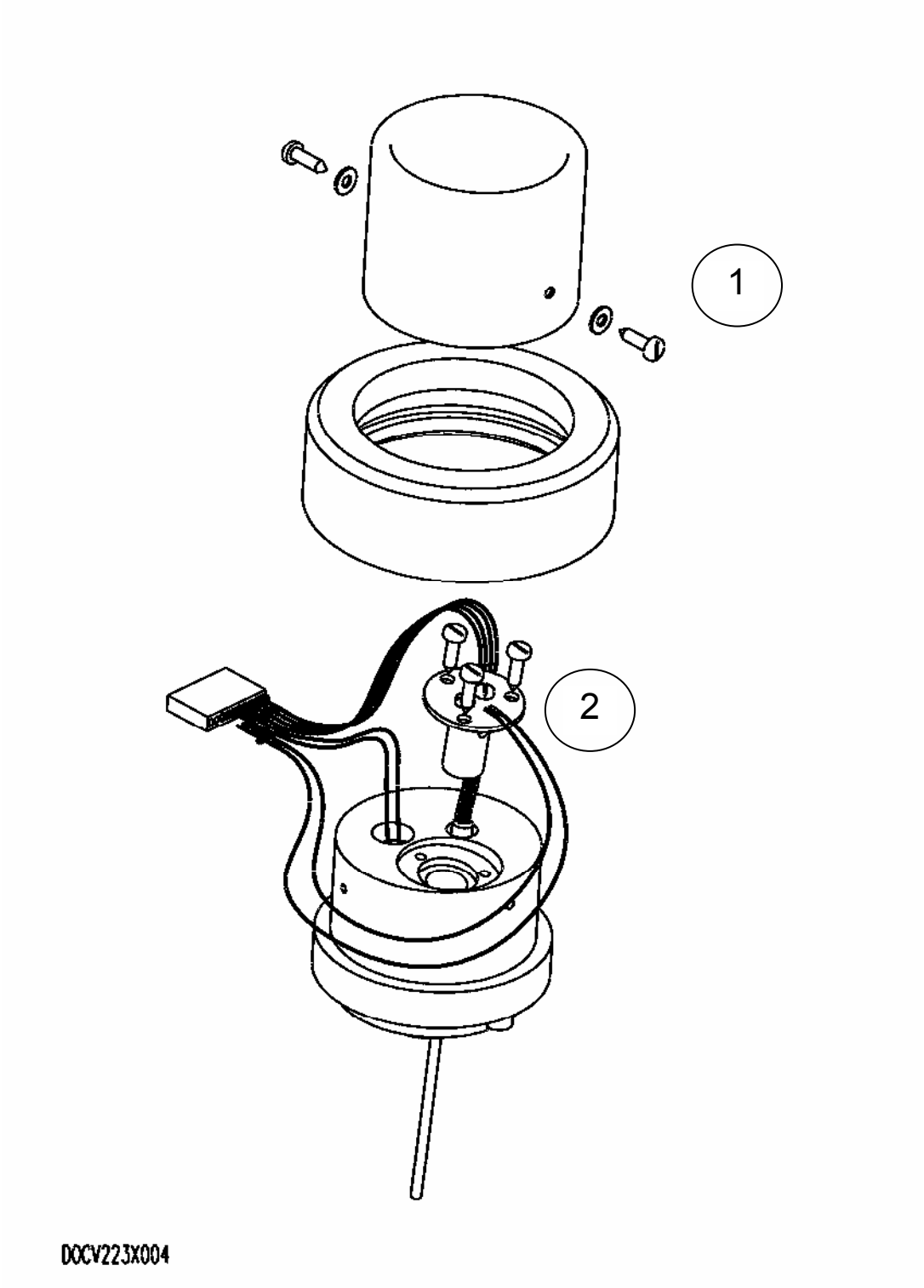
2.1 - Taking apart of the cover



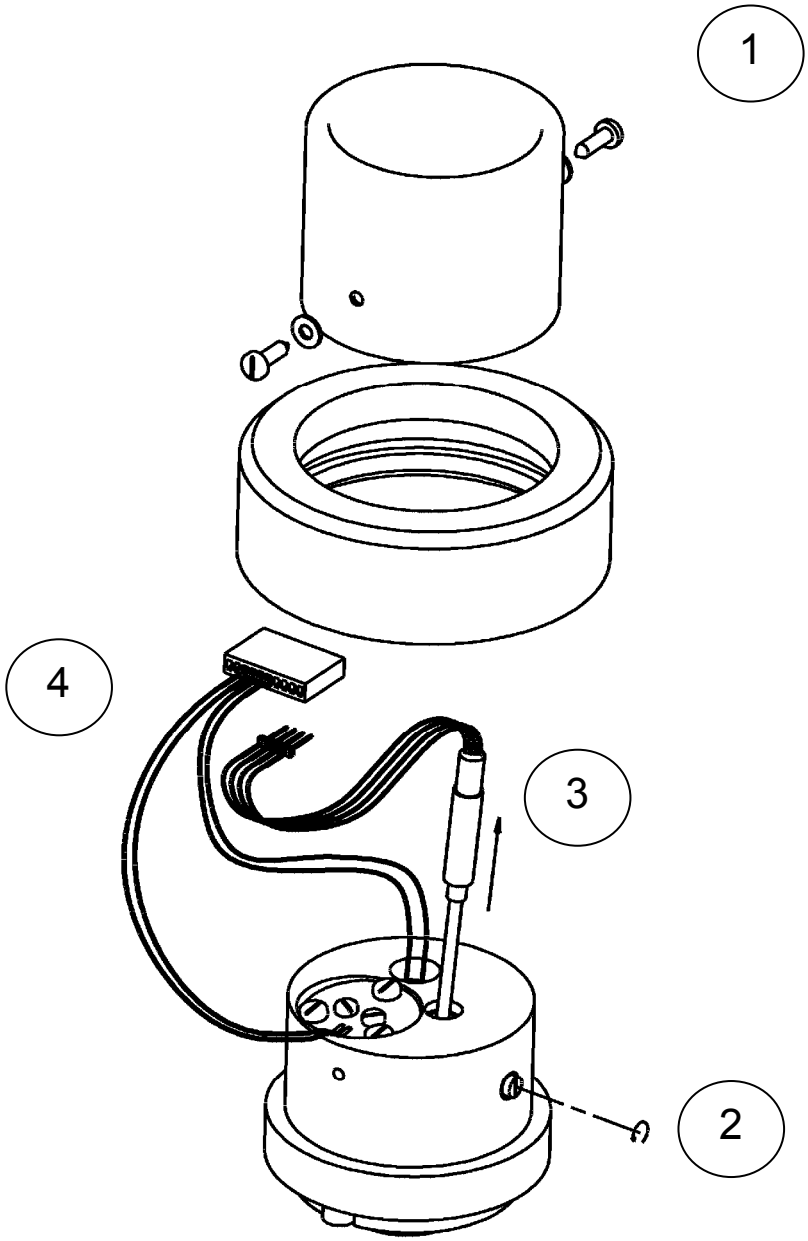
2.2 - Taking apart of the receiver



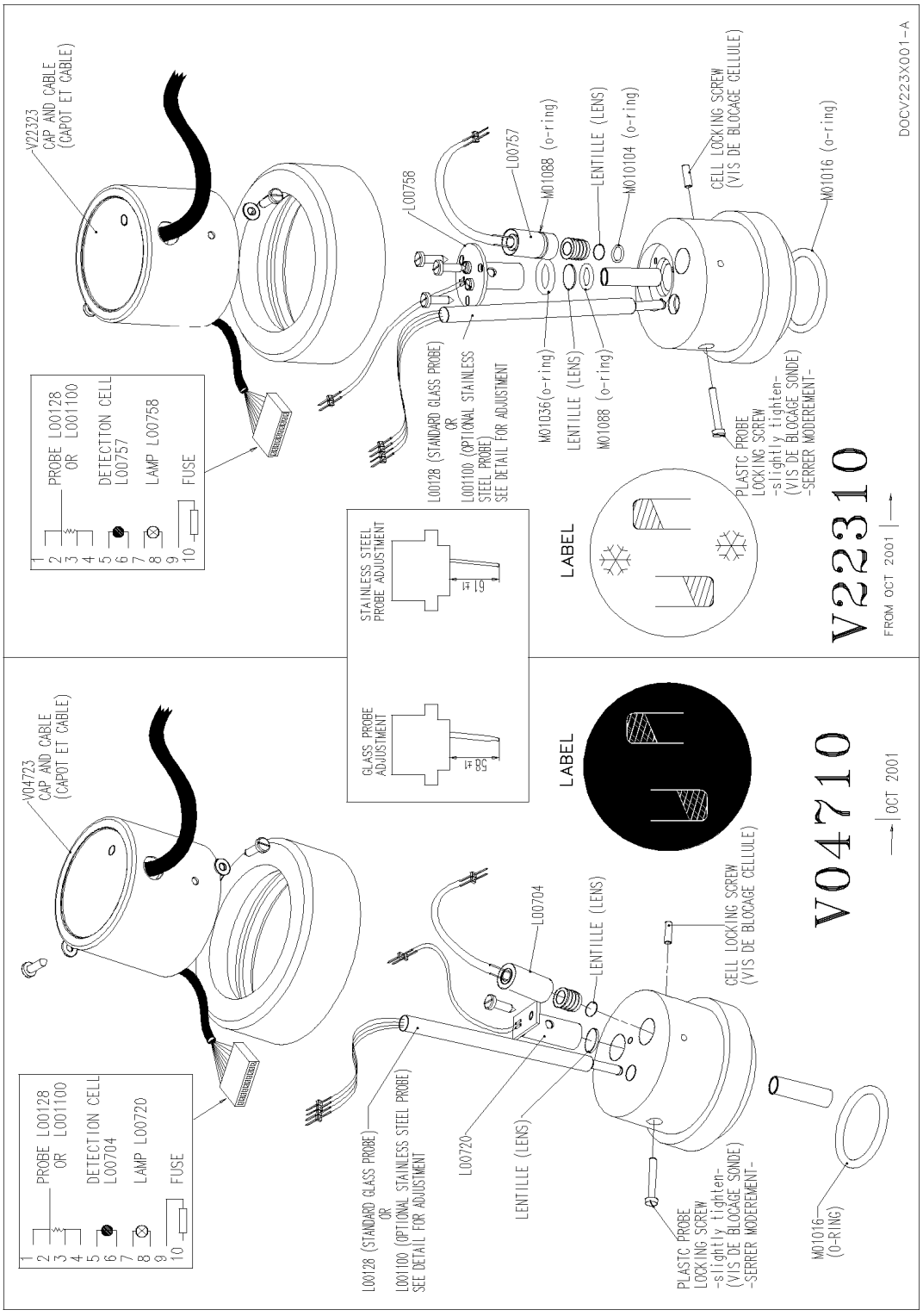
2.3 - Taking apart of the emitter



2.4 - Taking apart of the temperature probe



2.5 - New pour point detection head compatibility



Sample probes	*Part N*	*Description*	*Application range*
Standard	L00128	Sample temp. Probe / PP/ Glass	- 95 to +50°C (-139 to 122 °F)
Optional	L001100	Pour point metal probe / -60..+50C	- 60 to +50°C (-76 to 122 °F)

Compatible with ISL CPP97-6, CPP97-2 and CPP5Gs

Appendix E Using the Manual CFPP Kit on the CPP 5Gs in manual mode

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The manual mode consists in use only the temperature regulation function of the CPP 5Gs jacket to perform manual tests to determine the cold filter plugging point of a petroleum product.
These tests are carried out on the CPP 5Gs via the manual mode of the analyzer.

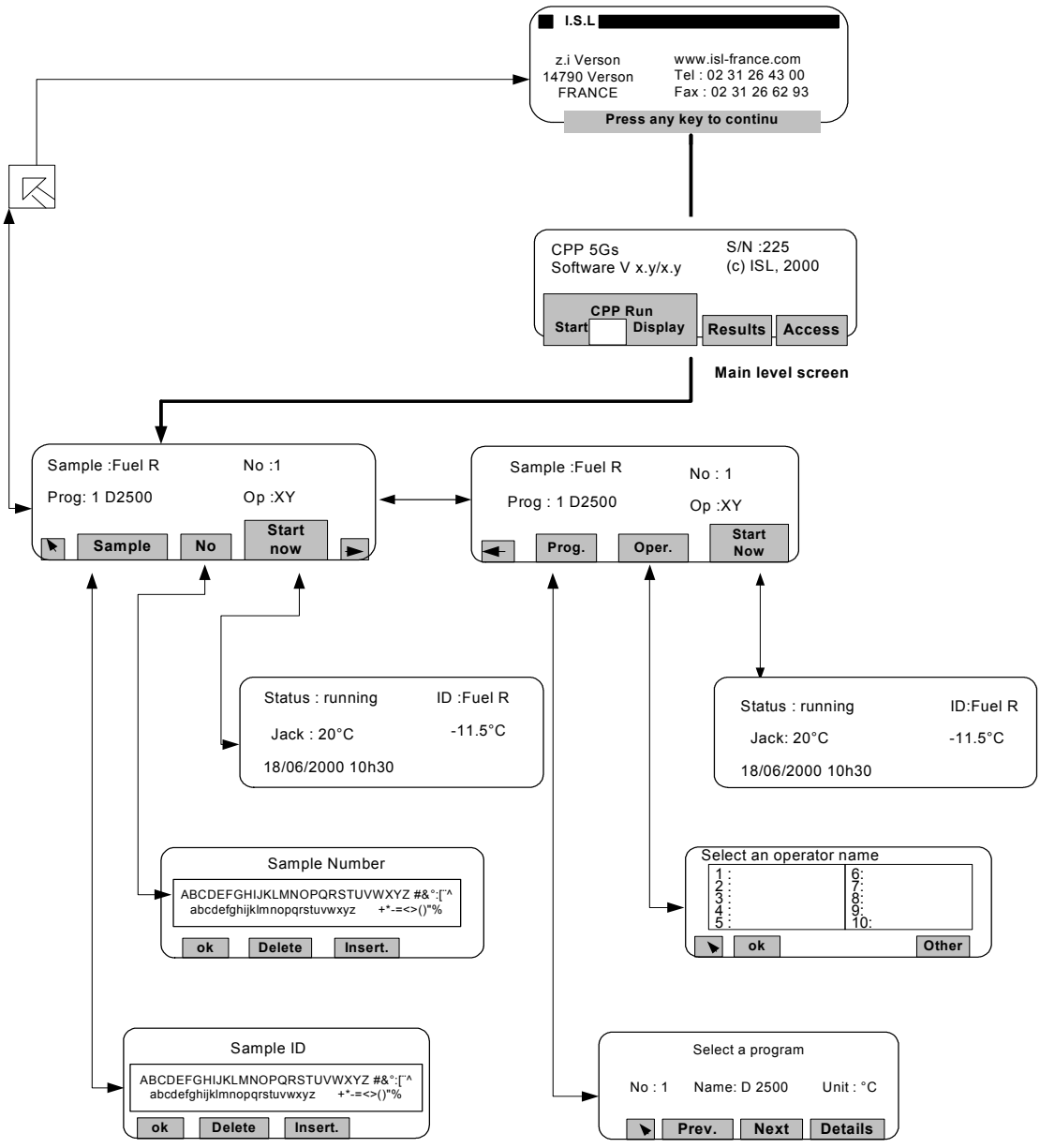


Diagram 1: Test initiating chart

The Manual CFPP Kit is made up the elements named in the **Packing list** supplied with the kit.
These elements conform to the requirements prescribed in the ASTM D6371 standard test method and its associated methods: IP 309, EN116 and JIS K2288 for measuring the cold filter plugging point.

- Clean and dry the elements making up the Manual CFPP Kit as specified in the standard method. Reassemble the filtration assembly as per Figure 42 page 107.
- Take a stopwatch.

1 - Preparing the sample

Before initiating the test phase, a sample has to be prepared. It will be remembered that the Manual CFPP kit for CPP 5Gs is intended for medium distillates and is not suitable for other hydrocarbons.

- Prepare the sample in accordance with the instructions of the standard method used for the manual cold filter plugging point test.
- Pour the sample thus filtered into the empty test jar (cleaned beforehand), up to the permanent level marking (a volume equivalent to 45ml).

2 - Setting up and adjustment of the suction kit

- Position the suction kit next to the analyzer so as to be able to read the flow meter and the U manometer when you are facing the analyzer.
- Fill with water and up to the mark the glass bottle equipped with the longest stainless steel tube.
- Fill with water the U manometer so as the water level corresponds with the zero of the short measuring tape.
- Position the stopcock ref. 8 (refer to the packing list, page 109) with its stand on the stand of the probe of the analyzer as per indications of the Figure 39 below.
- Connect the flexible tubing ref. 9 on the central hose nipple of the stopcock.
- Adjust the length of the flexible tubing up to the suction kit. Cut the flexible tubing and connect it to the hose nipple of the stopper of the empty glass bottle of the suction kit, as per indications of the Figure 39 below.
- Tip up the handle of the stopcock towards you to open the vacuum circuit to atmosphere.

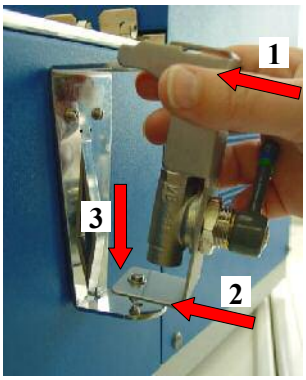


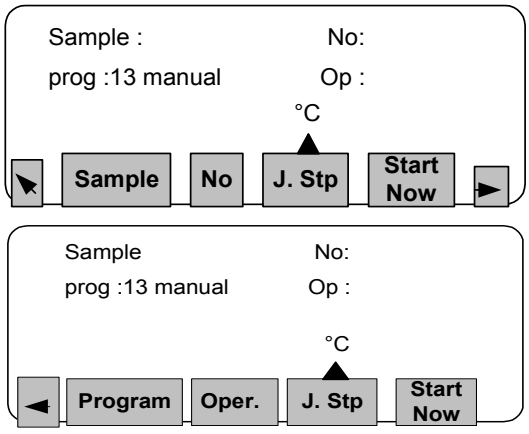
Figure 38 : Mounting of the stopcock (open position)

Figure 39 : Connection of the suction kit

- Plug in the pump and adjust the flow meter so as to have an air flow rate of 15 l/h.
- Verify the depression value is equal to 200 mmH_2O. If it is not the case, the depth of the immersed part of the stainless steel tube of the glass bottle containing water shall then be adjusted to obtain a depression of 200 mm ± 1 mm of water on the U manometer.

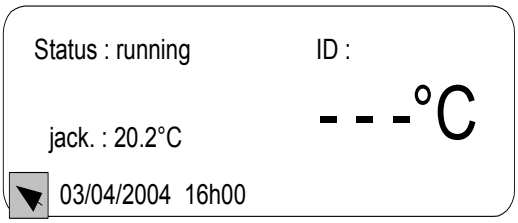
3 - Jacket preparation

- Remove and disconnect the measuring head connected to the analyzer at the present time.
- Remove the cork disk installed at the bottom of the analyzer jacket.
- Activate the ***CPP Run/Start&Display*** menu of the screen 1 of the main screens level (see Diagram 1 page 105).
  Note: The screen of the ***CPP Run/Start&Display*** menu is directly obtained at switching on the analyzer as soon as you have selected the language (if it has not been locked in the power on parameters). This measure has been taken to accelerate access to test-related menus.
- Then using the ***Prog.*** menu of the ***CPP Run/Start&Display*** menu screen 2 (see below), select the prestored program N°13 "Manual". This program, prestored in the analyzer, is associated with the manual mode run program allowing the operator to enter a jacket setpoint temperature.
  Validate with the **OK** key, the ***CPP Run/Start&Display*** menu appears thus:



- Enter the jacket setpoint temperature: press the **J.STP** key then enter –34.0°C. Validate with the **ENTER** key. The jacket setpoint temperature appears then in the field "J.Stp".

- Press the **START NOW** key. The test starts and the following screen appears :



The above screen displays the following data:

- Status: instrument status
- ID: sample ID
- Jack. : Jacket temperature
- Date and time of test
- - - -°C: sample temperature measured by the probe (disconnected in manual mode)

4 - Assembly of the filter and measuring unit on the analyzer

The assembly of the filter unit is performed according to the following procedure:

1. Insert the pipet ref. 2 (see the Packing list page 109) into the stopper ref. 3 as shown in the Figure 40 and the Figure 41 below:

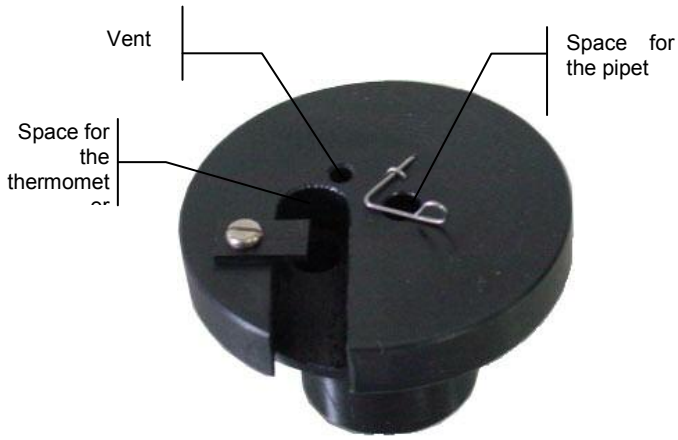


Figure 40 : Stopper in axonometry

Figure 41 : Positioning of the pipet on the stopper

2. When the pipet is introduced into the stopper, insert the filter unit into the end of the pipet under the stopper as per it is shown in the Figure 41 below:

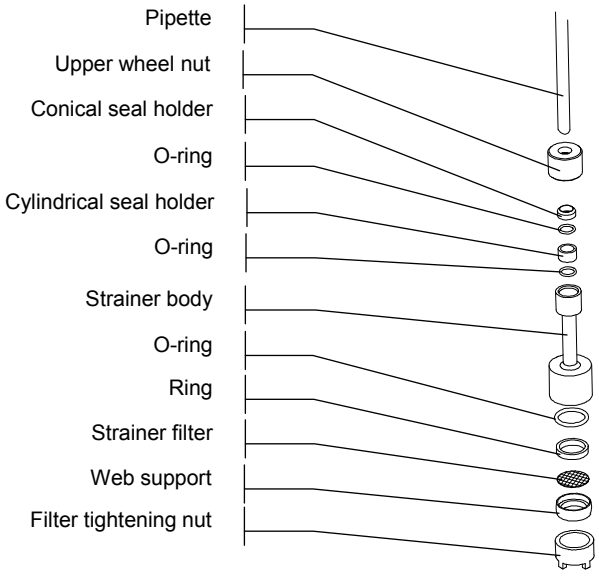


Figure 42: Assembly of the filter unit, with parts list.

3. Put the filter assembly into the test jar, having previously filled it.
4. Insert the thermometer ref. 1 into the stopper as per indications of the Figure 40. Push it until the mark drawn on the thermometer. Loosen the screw on the stopper and move the shim for it comes against the thermometer. Tighten the screw.
5. Put the measuring assembly in the positioning jig of the cork ring.
6. Place the insulating part (made up insulating ring and 2 spacers) ref. 7 in the jacket.
7. Place the adapter ring ref. 6 on the top of the jacket.
8. Insert the pipet connection ref. 10 to the end of the pipet which is free. Connect to it the rest of the flexible tubing ref. 9 already cut.
9. Adjust the flexible tubing length up to the stopcock. Cut the flexible tubing and connect it to the top hose nipple of the stopcock.

5 - Test running in manual mode

When the jacket temperature has reached the setpoint temperature, the test can start:

- Place the test jar assembly in the insulating part already placed in the jacket.
- Perform the test following instructions of the standard test method: when the sample temperature reaches a suitable integer value, tip up the handle of the stopcock towards the rear of the analyzer so that the filter assembly is connected to the vacuum source, causing the sample to be drawn through the wire mesh into the pipet; simultaneously start the stopwatch.
- When the specimen reaches the mark on the pipet, stop the stopwatch and turn the stopcock to its initial position to vent the pipet and so allow the sample to return to the test jar.
- Repeat the operations for 1°C decrease of the sample temperature until the temperature is reach at which the pipet is not filled to the 20 mL mark within 60 s. Record the temperature at which this last filtration was commenced as CFPP.

If it is necessary to decrease even more the jacket temperature:

- Press the **J.CSG.** key of the ***CPP Run Start&Display*** menu.
- Enter the new jacket temperature setpoint. Validate with the **ENTER** key.

The jacket setpoint temperature appears then in the field “J.Stp”.

- Press the **START NOW** key to apply the temperature setpoint. The test can continue.

To stop the manual test, simply press on the **STOP/TEST** button on the front panel of the device. The control software will ask for confirmation of the command (refer to the User Manual). Then activate the **PREVIOUS LEVEL** button (the arrow on the left bottom). The effect of both these actions is to re-establish display 1 of the ***FPP Run / Start*** menu.

6 - Packing List

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CFPP MANUAL KIT PAGE 2/2

PARTS SUPPLIED WITH EACH APPARATUS IN STANDARD
STANDARD REPUESTOS ENTREGADOS CON CADA APARATO

1 THERMOMETER ASTM 5C

2 PIPET CFPP EN 116

3 TEFLON STOPPER

4 TEST JAR CFPP EN 116

5 FILTER UNIT TLF EN 116

6 ADAPTATOR RING FOR FPP/CPP

7 INSULATING RING AND SPACERS

8 3 WAY VALVE WITH HOLDER

9 SILICON TUBE

10 PIPET CONNECTION

11 VACUUM KIT

12 *User Manual of the Manual CFPP Kit*

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